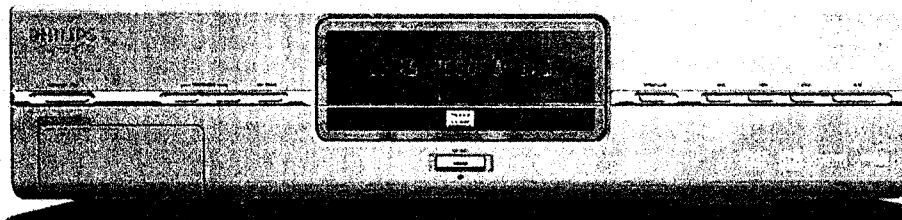
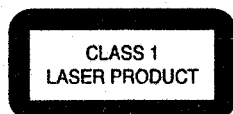


Service
Service
Service



TR01001_001
080502

Service Manual



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PHILIPS

1. Technical Specifications and Connection Facilities

1.1 General:

1.2.7 Tuning

Mains voltage : 198V-276V
Mains frequency : 43 Hz - 63Hz
Power consumption mains : 28 W
Power consumption standby : < 7 W
Power consumption low power stand-by : < 3 W

Automatic Search Tuning
scanning time without antenna : typ. 3 min, PAL
stop level (vision carrier) : $\geq 37\text{dB}\mu\text{V}$
Maximum tuning error of a recalled program : $\pm 62.5\text{ kHz}$
Maximum tuning error during operation : $\pm 100\text{ kHz}$

1.2 RF Tuner

Test equipment:Fluke 54200 TV Signal generator
Test streams:PAL BG Philips Standard test pattern

Tuning Principle

automatic B.G. I, DK and LL detection
manual selection in "STORE" mode

1.2.1 System:

1.3 Analogue Inputs

1.3.1 SCART 1 (Connected to TV)

1.2.2 RF - Loop Through:

Frequency range : 45 MHz - 860 MHz
Gain: (ANT IN - ANT OUT) : -6 dB to 0dB

1.2.3 Radio Interference:

Input voltage /3 tone method ($\pm 40\text{ dB min}$) : no limit

1.2.4 Receiver:

PLL tuning with AFC for optimum reception
Frequency range : 45.25 MHz - 857 MHz
Sensitivity at 40 dB SIN : $\geq 60\text{dB}\mu\text{V}$ at 75 Ω
(video unweighted)

1.2.5 Video Performance:

Channel 25 / 503.25 MHz
Test pattern: PAL BG PHILIPS standard test pattern,
RF Level 74 dBV
Measured on SCART 1
Frequency response : 0 - 4.00 MHz $\pm 0.4\text{dB}$
Group delay (0.1 MHz - 4.4 MHz) : 0 nsec $\pm 150\text{nsec}$

1.2.6 Audio Performance:

Audio Performance Analogue - HiFi:

Frequency response at SCART 1 (L+R) output : 100 Hz - 12 kHz / $\pm 2\text{dB}$
S/N according to DIN 45405, 7, 1967 : and PHILIPS standard test pattern video signal:
video signal: FM $\geq 50\text{dB}$; AM $\geq 45\text{dB}$, unweighted
Harmonic distortion (1 kHz, $\pm 25\text{ kHz deviation}$) : FM $\leq 1.5\%$, AM $\leq 2\%$

Audio Performance NICAM:

Frequency response at SCART 1(L+R) output : 40 Hz - 15 kHz $0 \pm 3\text{dB}$
S/N according to DIN 45405, 7, 1967 : and PHILIPS standard test pattern video signal:
Harmonic distortion (1 kHz): $\geq 60\text{ dB unweighted}$
: $\leq 0.5\%$

Crosstalk 1kHz : $>85\text{dB}$
Crosstalk 20Hz-20kHz : $>70\text{dB}$
Frequency response 20Hz- 20kHz : $\pm 0.2\text{dB max}$
Signal to noise ratio : $>85\text{ dB}$
Dynamic range 1kHz : $>75\text{dB}$
Dynamic range 20Hz-20kHz : $>70\text{dB}$
Distortion and noise 1kHz : $>75\text{dB}$
Distortion and noise 20Hz-20kHz : $>65\text{dB}$
Intermodulation distortion : $>70\text{dB}$
Mute (spin-up, pause, access) : $>85\text{dB}$
Outband attenuation: : $>40\text{dB above }25\text{kHz}$

1.6 Digital Output

1.6.1 Coaxial

CDDA/LPCM (incl MPEG1)
MPEG2, AC3 audio
DTS
: according IEC658
: according IEC1937
: according IEC1937, amendment 1

1.7 Digital Video Input (IEEE 1394)

1.7.1 Applicable Standards

Implementation according:
IEEE Std 1394-1995
IEC 61883 - Part 1
IEC 61883 - Part 2 SD-DVCR (02-01-1997)
Specification of consumer use digital VCR's using 6.3 mm magnetic tape - dec.1994
Mechanical connection according:
Annex A of 61883-1

1.8 P50 System Control

Via SCART pin nr 10

1.9 Dimensions and Weight

Height of feet : 10mm
Apparatus tray closed : WxDxH :435 x 324.5 x 88cm
Apparatus tray open : WxDxH :435 x 366 x 88cm
Weight without packaging : app. 4 kg $\pm 0.5\text{ kg}$
Weight in packaging : app. 6.5 kg

1.10 Laser Output Power & Wavelength

1.10.1 DVD

Output power during reading : 0.8mW
Output power during writing : 20mW
Wavelength : 660nm

1.10.2 CD

Output power : 0.3mW
Wavelength : 780nm

1.3.3 Audio/Video Front Input Connectors

Audio

Input voltage : 2 Vrms
Input impedance : $>10\text{k}\Omega$

Video - Cinch

Input voltage : 1 Vpp $\pm 3\text{dB}$
Input impedance : 75 Ω

Video - YC (Hosiden)

Input voltage Y : 1Vpp $\pm 3\text{dB}$
Input impedance Y : 75 Ω
Input voltage C : burst 300 mVpp $\pm 3\text{ dB}$
Input impedance C : 75 Ω

1.4 Video Performance

All outputs loaded with 75 Ohm
SNR measurements over full bandwidth without weighting.

1.4.1 SCART (RGB)

SNR : $> -65\text{ dB on all output}$
Bandwidth : 4.8 MHz $\pm 2\text{dB}$

1.5 Audio Performance CD

1.5.1 Cinch Output Rear

Output voltage 2 channel mode : 2Vrms $\pm 2\text{dB}$
Channel unbalance (1kHz) : $<1\text{dB}$
Crosstalk 1kHz : $>95\text{dB}$
Crosstalk 20Hz-20kHz : $>85\text{dB}$
Frequency response 20Hz- 20kHz : $\pm 0.2\text{dB max}$
Signal to noise ratio : $>95\text{ dB}$
Dynamic range 1kHz : $>85\text{dB}$
Dynamic range 20Hz-20kHz : $>80\text{dB}$
Distortion and noise 1kHz : $>85\text{dB}$
Distortion and noise 20Hz-20kHz : $>75\text{dB}$
Intermodulation distortion : $>77\text{dB}$
Mute : $>95\text{dB}$
Outband attenuation: : $>40\text{dB above }30\text{kHz}$

1.5.2 Scart Audio

Output voltage 2 channel mode : 1.6Vrms $\pm 2\text{dB}$
Channel unbalance (1kHz) : $<1\text{dB}$

Video Plus
"Video Plus+" and "PlusCode" are registered trademarks of the Gemstar Development Corporation. The "Video Plus+" system is manufactured under licence from the Gemstar Development Corporation.

2.2 Warnings

2.2.1 General

All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD,). Careless handling during repair can reduce life drastically. Make sure that, during repair, you are at the same potential as the mass of the set by a wristband with resistance. Keep components and tools at this same potential.

- Safety regulations require that after a repair, you must return the unit in its original condition. Pay, in particular, attention to the following points:

- ### 2.1.2 Laser Safety

Laser Device Unit

CLASS 1
LASER PRODUCT

Figure 2-1

Note: Use of controls or adjustments or performance of procedures other than those specified herein, may result in hazardous radiation exposure. Avoid direct exposure to beam.

2.2 Warnings

2.2.1 General

- ### 2.2.2.2 Laser

[illegible]

Figure 2-2

2.2.3 Notes

Dolby
Manufactured under licence from Dolby Laboratories. "Dolby", "Pro Logic" and the double-D symbol are trademarks of Dolby Laboratories. Confidential Unpublished Works.
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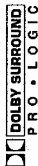


Figure 2-3

Trusurround
TRUSURROUND, SRS and symbol (fig 2-4) are trademarks of SRS Labs, Inc. TRUSURROUND technology is manufactured under licence from SRS Labs, Inc.



Figure 2-4

3. Directions For Use

◀	Select previous title/search backwards: Briefly press the button during playback. Previous chapter/film or previous title. Hold down the button: Search backwards. Hold down the button during the still picture: slow motion backwards.
▶	Select next title/search forwards: Briefly press the button during playback. Next chapter/film or next title. Hold down the button: Search forwards. Hold down the button during the still picture: slow motion forward.
■	STOP Stop: Stop playback / recording, except with programmed recordings (TIMER). Hold down the button to open and close the disc tray.
●	REC/OTR Record: Record the current TV channel.
EDIT	EDIT : For displaying the edit menu for DVD+ (RW) discs, for setting chapter markers.
TIMER	TIMER : To program according with ShowView [®] without ShowView or to alter programmed recordings.

Additional TV functions

TV VOLUME +	TV volume: Increase TV volume
TV VOLUME -	TV volume: Reduce TV volume
0..9	Number buttons 0 - 9
CHANNEL +	TV programme number: To select a higher programme number
CHANNEL -	TV programme number: To select a lower programme number

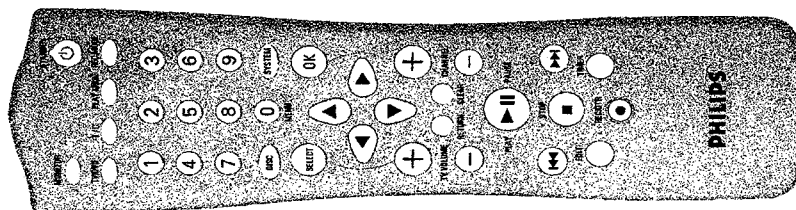
For the following functions you need to hold down the button **DVD/TV** at the side and then select the function you need with the appropriate button.

Front of the device

STANDBY/ON	Switch on or off: To switch off or on, interrupt a function, interrupt a programmed recording (TIMER).
CHANNEL -	Select: Lower programme number
CHANNEL +	Select: Higher programme number
REC MODE	Record type (quality): To select the maximum possible record time

The remote control

MONITOR	Monitor : This button lets you switch between the (internal) TV tuner in the DVD recorder (TV picture on the TV set) and playback on the DVD recorder.
STANDBY	Switch on or off: To switch set on or off, interrupt menu function, interrupt a programmed recording (TIMER).
TV/DVD	TV/DVD switch : Switches the start socket: EXT 2 AUX I/O directly to the TV set. This lets you watch the picture from any unit connected to this start socket (satellite box, video recorder or satellite receiver) and at the same time record from another source. EXT 2 AUX I/O you can use this button to switch between TV reception and DVD recording. This, however, functions only if you have connected your TV set to the DVD recorder using a start cable (socket: EXT 1 TO TV I/O) and your TV set reacts to the switching.
T/C	Title/Chapter : Choose the T (Title)/ C (Chapter) directly from the menu bar. If IFEP appears in the display, the index menu from a recorded disc or an introductory film will be shown. In this case, this function is not available.
PLAY MODE	Playback type : Choose between repeat, shuffle play and intro-scan.
REC. MODE	Record type (quality) : To select the maximum possible record time.
0..9	Number buttons 0 - 9
DISC-MENU	Disc menu : To show the DVD menu or the index screen.
SYSTEM-MENU	System menu : Call up/change the main menu (menu bar at the top of the screen).
SELECT	Select : Select function/value.
OK	Store/confirm : To store or confirm entry.
◀ ▶ ▲ ▼	Cursor keys : Left, right, up, down.
RETURN	Back : Return to previous menu on a video CD (VCD). This function works also on some DVD.
CLEAR	Delete : To delete last entry or clear programmed recording (TIMER).
CHANNEL +	Plus : Next programme number.
CHANNEL -	Minus : Previous programme number.
PLAY/PAUSE	Playback/pause : Play back a disc. If this button is pressed during playback, the DVD recorder switches to pause. You will see a still picture. If this button is pressed during recording, the DVD recorder will also switch to pause.



EXT 1 TO TV/IO	Start socket 1: Connection of a TV set: RGB-output
OUT S-VIDEO (Y/C)	S-Video output: Connection of an S-Video compatible TV set
OUT VIDEO (CVBS)	Video output (yellow socket): Connection of a TV set with a video input (CVBS: Composite Video)
OUT L AUDIO R	Analogue audio output (white/red socket): Connection of a TV set with audio input sockets or connection of an additional device (amplifier/recorder)
DIGITAL AUDIO OUT	Digital audio output: Connection of a digital audio device (amplifier/recorder)

The symbols on your DVD recorder display

These symbols can light up on your DVD recorder display:

TITLE	Displays the title number: selected/played (DVD)
TRACK	Displays the track selected/played (VCD/CD)
DVD+RW	Displays the inserted DVD disc: DVD (DVD+R / DVD+RW). Disc types 'DVD-R/DVD-RW' are shown as DVD.
S-VIDEO	Displays the CD-disc inserted: S VCD/VCD/CD
BB+	Displays recording type: Quality/Playback type: HQ, SP, EP, LP, PP.
CHAPTER	Displays the chapter selected/played
TOTAL TIME	Total playback time
REMAIN TIME	Time remaining
TIME	Time used
DTS	A DTS audio signal is available on the digital audio output
DD DIGITAL	A Dolby digital audio signal is available on the digital audio output
MPEG	An MPEG audio signal is available on the digital audio output
PCM	A PCM audio signal is available on the digital audio output
CHANNEL	Channel/programme number
II	Playback/record interrupted (Pause)
RECORD	Recording in progress
⏏	A satellite recording has been programmed.
⏏	A remote control signal has been received
⏏	A recording (timer) has been programmed
DECODER	A decoder has been assigned to the current TV channel (programme)



ENGLISH

RECORD	Record: Record the current TV channel
RECORD LED	Recording in progress: Red light on the RECORD button to indicate recording in progress
OPEN/CLOSE	Open/close disc tray: Open/close disc tray
⏮	Select previous title/search backwards
⏭	Select next title/search forwards
■STOP	Stop: Interrupt playback/recording
▶PLAY/PAUSE	Play/pause: Playback/recorded disc: interrupt playback: still picture

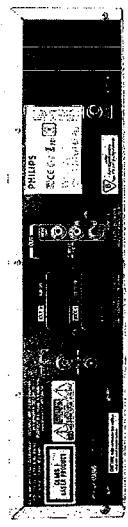
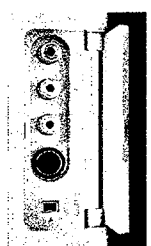
Behind the flap at the left-hand corner on the front

DV	I-Link/ DV socket: (digital video input: IEEE 1394, FireWire). Connecting a digital camcorder or other suitable device (programme number: 1/P1/2).
S-VIDEO	S-Video socket: Connection of SVHS/HB camcorders or SVHS/HB video recorders (programme number: 1/P1/1)
Yellow socket VIDEO	Video input socket: Connection of camcorders or video recorders (programme number: 1/P1/1)
Whitered socket left AUDIO right	Audio input socket left/right: Connection of camcorders or video recorders (programme number: 1/P1/1)

Switching between sockets IN S-VIDEO (Y/C) and IN VIDEO (CVBS) is done automatically. In case both sockets are used, the signal received at socket IN S-VIDEO (Y/C) is treated with priority.

Back of the unit

~ MAINS	Mains socket: Connection to the mains supply (230V/50Hz)
ANTENNA	Aerial Input: Connection of the aerial
TV	Aerial output: Connection of the TV set
EXT 2 AUX I/O	Start socket 2: Connection of an additional device (satellite receiver, set-top box, video recorder, camcorder, etc.)



EMPTY DISC	The disc inserted is either new or has been completely erased (no recordings).
PROTECTED	The disc is protected against recording.
MAX TITLE	The maximum number of titles per disc has been reached. The maximum number of titles per disc is 48.
MAX CHAP	The maximum number of chapters per title/disc has been reached. The maximum number of chapters per title is 99 and 124 per disc.
DISC FULL	The disc is full. There is no space for new recordings.
PAUSE	A disc with PAL recordings has been inserted. The machine is trying to record an NTSC signal. Insert a new disc or one that contains NTSC recordings.
NTSC DISC	A disc with NTSC recordings has been inserted. The machine is trying to record a PAL signal. Insert a new disc or one that contains PAL recordings.
RECORDING	An illegal action (e.g. OPEN/CLOSE button) was attempted during recording.
FREE TITLE	Playback was started for an empty title or the following title is empty.
DISC LOCK	An attempt has been made to record during playback of a protected disc. This message appears if an attempt is made to insert a chapter marker (EDIT button).
DISC ERR	An error occurred when the title was being written. If this error keeps occurring, please clean the disc or use a new one. You will find information on how to clean the disc in the next chapter in the section 'Cleaning the disc'.
DISC ERROR	An error occurred when writing the title. Recording was continued; the error was skipped.
SETUP	After the automatic channel search, the menu for time/date settings appears on the screen.
WAIT BT	During the automatic channel search, the TV channels found will be counted.
BLOCKED	It is not possible to close/open the disc tray.
SAFE RECD (SAFE RECORD)	The new recording will be made at the end of all the other recordings.
EASYLINK	The 'EasyLink' function is currently transferring information from the TV set.

ENGLISH

VPS/PDC

Video programming system / programme delivery control: A VPS or PDC code will be transmitted for the selected TV program.

NICAM

The DVD recorder has detected a Nicam audio signal.

STEREO

During playback a HiFi/2 channel tone was detected or a HiFi/2 channel tone was received.

MULTIFUNCTION DISPLAY/TEXT LINE

- a) Clock
- a) Disc title playing time
- a) OTS switch-off time
- a) Title name
- a) Display of programme number of TV channel/postion/channel range function.
- a) Display of information, warnings.

Messages in the DVD recorder display

The following messages may appear in your DVD recorder display

TV ON	The DVD recorder is currently in the initial installation mode. Switch on your TV set and read section 'Installing your DVD recorder' in chapter 'Initial installation'.
NO SIGNAL	No input signal available (signal inadequate or unstable).
MENU	The menu on the screen is active.
OPENING	Disc tray opening.
TRAY OPEN	Disc tray open.
CLOSING	Disc tray closing.
READING	Disc being read.
MENU UPDT	Once recording has been successfully completed the table of contents is created.
WAIT MENU	The menu structure is created after the first recording has been made on a new disc.
COPY PROT	You have tried to copy a copy-protected DVD/video cassette.
WAIT	Please wait until this message disappears. The DVD recorder is busy performing a task.
NO DISC	No disc has been inserted for recording. If a disc has been inserted, perhaps it cannot be read.
INFO	Information on the inserted DVD is displayed on the screen.
JUST	The DVD recorder is processing the changes to make them DVD compatible.
ERASING	The entire disc is erased.

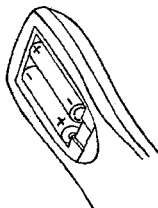
READING

THIS AREA IS USED TO READ THE DISC. WHEN THE DISC IS READ, THE DISC IS ERASED. THE DISC IS ERASED. THE DISC IS ERASED.

2

Connecting the DVD recorder

Preparing the remote control for operation



The remote control and its batteries are packed separately in the original DVD recorder packaging. You must install the batteries in the remote control before use - described in the following section.

- 1 Take the remote control of the DVD recorder and the enclosed batteries (2 batteries).
- 2 Open the battery compartment, insert the batteries as shown and then close the battery compartment.

The remote control is now ready to use. Its range is approximately 5 to 10 meters.

'Aim' correctly

In the following sections, you will need the remote control for the first time. Always point the front of the remote control at the DVD recorder and not at the TV set.

Connecting your DVD recorder to the TV set

The necessary cable connections must be made before you can record or playback TV programmes using your DVD recorder.

Connect the DVD recorder directly to your TV set. If there is a video recorder in between the picture quality may be poor because of the copy protection system built into the DVD recorder.

We recommend that you use a start cable to connect your TV set and DVD recorder.



What is a start cable?

The start or Euro AV cable serves as the universal connector for picture, sound and control signals. With this type of connection, there is practically no loss of quality in picture or sound transmission.

ENGLISH

When you install your DVD recorder for the first time, select one of the following options:

Connecting with a start cable and Easy Link
If your TV set is equipped with Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic Dialogue, and you wish to use a start cable.

What is Easy Link?

If your TV set is equipped with functions such as Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic Dialogue, which are fully compatible with one another (TV set, DVD recorder, etc.), your DVD recorder can exchange information with your TV set. Please see your TV's operating instructions.

'Connecting with a start cable without Easy Link'

If your TV set is not equipped with Easy Link, Cinema Link, NextView Link, Q-Link, Smart Link, Megalogic Dialogue, and you wish to use a start cable.

Connecting with an S-Video (Y/C) cable

If your TV set is equipped with an S-Video (Y/C) socket.

What is an S-Video (Y/C) cable?

This connecting cable, also known as the SVHS cable, is used to transmit the brightness signal (Y signal) and colour signal (C signal) separately. This mini DIN socket/plug is also called a Hosen socket/plug.

'Connecting with video (CVBS) cable'

If your TV set is equipped only with a video (CVBS) socket.

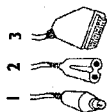
What is 'Video (CVBS)'?

This socket, usually referred to as the Cinch socket, is used for transmitting the composite video signal (R/G/B, C/V/S). In this method of transmission the colour signal and the brightness signal are transmitted on the same cable. In certain circumstances, this can lead to problems with the picture, such as 'Moire' patterns.

Connecting with a scart cable and 'Easy Link'

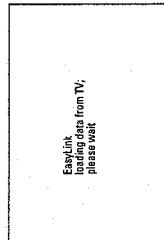
Your DVD recorder can exchange information with your TV set using 'Easy Link'. Your TV channels can also be transferred in the same order from your TV set to your DVD recorder using 'Easy Link'.

Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), a special scart cable (3, suitable for EasyLink).



- 1 Switch off your TV set.
- 2 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.
- 3 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.
- 4 Plug a special scart cable (for EasyLink) into the scart socket EXT 1 TO TV410 at the back of the DVD recorder and the corresponding scart socket at the back of the TV set (see TV set operating instructions).
- 5 Switch on the TV set.
- 6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket.

A message appears on the screen announcing that the transfer has started. 'EASY LINK' appears on the display during transfer. The TV set transfers all stored TV channels, in the same order, to the DVD recorder. This may take several minutes.



Connecting the DVD recorder

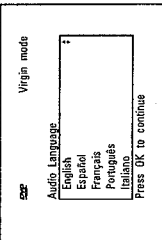
13

Problem

x 'Time', 'Year', 'Month', 'Date' appears on my TV screen for confirmation

Normally, the date and time are transferred from the data of the TV channel that is stored under programme P01. If the aerial signal is too weak or disrupted, you must manually set the time and date.

- 1 Check if the time in the 'Time' is correct.
- 2 If required, change the time with the number buttons 0-9 on your remote control.
- 3 Select the next line with \blacktriangle or \blacktriangledown .
- 4 Check the displayed settings for 'Year', 'Month' and 'Date'.
- 5 When all information is correct, save by pressing OK.



Problem

x I can see more installation menus on my TV set

Not all the necessary data has been transferred. Please enter the settings by hand as follows. For more information on the various functions see initial installation in 'Installing your DVD recorder'.

- 1 Select the desired audio language using \blacktriangledown or \blacktriangle and confirm with OK.
- 2 Select the desired subtitle language with \blacktriangledown or \blacktriangle and confirm with OK.
- 3 Select the desired picture format using \blacktriangledown or \blacktriangle .

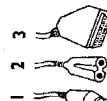
For a 4:3 TV set: choose format (black bars above and below the picture)
For a 4:3 TV set: full height format with the sides cut off
For a 16:9 TV set

- 4 Confirm with OK.
- 5 Select your country with \blacktriangledown or \blacktriangle .
- 6 If your country does not appear, select 'Other'.
- 7 Confirm with OK.

Initial installation is now complete.

Connecting with a scart cable without 'Easy Link'

Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), a scart cable (3).



- 1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.

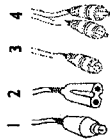


14

Connecting the DVD recorder

Connecting with an S-Video(Y/C) cable

Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), an S-Video (SVHS) cable (3), an audio cable (4, supplied, red/white plug).



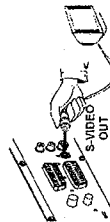
1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.



2 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



3 Insert one end of a S-Video (SVHS) cable into the OUT S-VIDEO (Y/C) socket at the back of the DVD recorder and the other end into the S-Video (SVHS) input socket on the TV set (usually labelled 'S-Video In' or 'SVHS In'. See TV operating instructions).

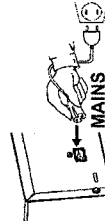


4 Insert one end of the supplied audio (Cinch) cable into the red/white Cinch socket OUT L AUDIO R at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio In' or 'AV In'. See TV operating instructions).



5 Switch on the TV set. Switch the TV set over to this input socket or select the relevant channel number. Please see your TV's operating instructions for the channel number you need.

6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket. 'TV ON' will appear on the display.



Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

Connecting the DVD recorder

ENGLISH

2 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



3 Plug a start cable into the start socket EXT 1 TO TV/IO at the back of the DVD recorder and the start socket for the DVD recorder at the back of the TV set (see TV set operating instructions).

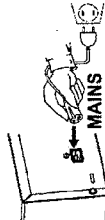


My TV set has several start sockets. Which one should I use?

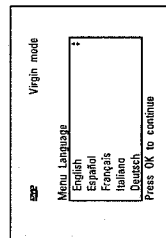
Select the start socket that is suitable for both video output and for video input.
My TV set shows me a selection menu for the start socket.
Select 'VCR' as the source for this start socket.

4 Switch on the TV set.

5 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket. 'TV ON' will appear on the display.



6 If the connection was properly made and your TV was automatically switched to the programme number for the start socket, e.g. 'EXT', 'U', 'AV', you will see the following picture:



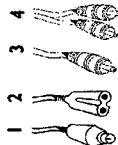
Problem

* My screen is empty.
✓ Many TV sets are switched by the DVD recorder to the programme number for the start socket by way of a control signal sent through the start cable.
✓ If the TV set does not automatically switch to the start socket, programme number, manually change to the corresponding programme number on your TV set (see your TV's operating instructions).
✓ Check that the start cable is connected from the TV set to the EXT 1 TO TV/IO socket at the back of the DVD recorder. The EXT 2 AUX IO socket is intended only for additional devices.

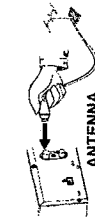
Then, read the paragraph on 'Initial installation' in 'Installing your DVD recorder'.

Connecting the DVD recorder

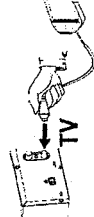
Connecting with video(CVBS) cable



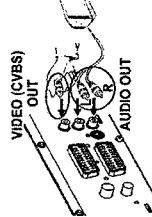
Have the following cables ready:
an aerial cable (1, supplied), a mains cable (2, supplied), a video (CVBS) cable (3, supplied, yellow plug), an audio cable (4, supplied, red/white plug).



- 1 Remove the aerial cable plug from your TV set. Insert it into the ANTENNA socket at the back of the DVD recorder.



- 2 Insert one end of the supplied aerial cable into the TV socket at the back of the DVD recorder and the other end into the aerial input socket at the back of the TV set.



- 3 Insert one end of the supplied video (CVBS) cable into the yellow Cinch socket OUT VIDEO (CVBS) at the back of the DVD recorder and the other end into the video input socket (usually yellow) on the TV set (usually labelled 'Video in' or 'AV in'). See TV operating instructions.



- 4 Insert one end of the supplied audio (Cinch) cable into the red/white Cinch socket OUT L AUDIO R at the back of the DVD recorder and the other end into the audio input socket (usually red/white) on the TV set (usually labelled 'Audio in' or 'AV in'). See TV operating instructions.



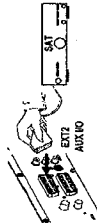
- 5 Switch on the TV set. Switch the TV set over to the Video/Audio input socket or select the relevant programme number. Please see your TV's operating instructions for the programme number you need.



- 6 Insert one end of the supplied mains cable into the mains socket ~MAINS at the back of the DVD recorder and the other end into the wall socket. 'TV ON' will appear on the display.

Then, read the paragraph on 'Initial Installation' in 'Installing your DVD recorder'.

Connecting additional devices to the second scart socket



You can connect additional devices such as decoders, satellite receivers, camcorders, etc. to the EXT 2 AUX IO socket. When playback is started on this additional device the DVD recorder automatically connects the EXT 2 AUX IO scart socket with the EXT 1 TO TV-IO scart socket. You will then see the picture from the additional device on your TV set, even if the DVD recorder is switched off.
The TV/DVD button on the remote control allows you to switch between playback through the EXT 2 AUX IO scart socket and playback from the DVD recorder.

Connecting additional video recorders

You can connect a video recorder to the EXT 2 AUX IO socket. If you have an SVHS video recorder you can additionally use the OUT S-VIDEO (Y/C) socket and the OUT L AUDIO R sockets.

Please note:
Most pre-recorded video cassettes and DVDs are copy-protected. If you try to copy them you will see the message 'COPY PROTECT' on the DVD recorder's display.

When copying video cassettes, the display on the DVD recorder shows 'NO SIGNAL'.

- ✓ Check that the scart cable is plugged in firmly.
- ✓ The DVD recorder may not be able to recognise the video input signal if this signal is poor or does not comply with relevant standards.
- ✓ When I copy DVD video discs or pre-recorded video cassettes the picture is fuzzy and the brightness varies.
- ✓ This happens if you try to copy DVDs or video cassettes that have been copy-protected. Even though the picture on the TV is fine the recording on the DVD-R(W) is faulty. This interference is unavoidable with copy-protected DVDs or video cassettes.

Problem

Connect camcorder to the front sockets

To copy camcorder recordings, you can use the front sockets. These sockets are located behind the flap on the left hand side.

Best Picture Quality

If you have a DV or Digital 8 camcorder, connect the DV input of the DVD recorder to the appropriate DV output on the camcorder.

Very good Picture Quality

If you have a Hi8 or S-VHS(C) camcorder, connect the S-VIDEO input of the DVD recorder to the appropriate S-VHS output on the camcorder. You must also connect the audio input left AUDIO right on the DVD recorder to the audio output on the camcorder.

Good Picture Quality

If you have a camcorder that only has a single video output (Composite Video, CVBS), connect the VIDEO input on the DVD recorder to the appropriate output on the camcorder. You must also connect the audio input left AUDIO right on the DVD recorder to the audio output on the camcorder.

Connecting audio devices to the analogue audio sockets

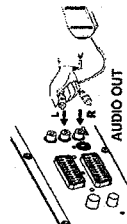
Two analogue audio sockets OUT L AUDIO R (audio signal output left/right) are located at the back of the DVD recorder.

These can be used to connect the following:

- a receiver with Dolby-Pro-Logic
- a receiver with two-channel analogue stereo

Can I use the 'Phono' input on my amplifier?

This socket (input) on the amplifier is designed only for record players without preamplifiers. Do not use this input for connecting the DVD recorder. The DVD recorder or the amplifier may be damaged as a result.

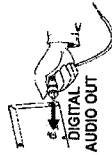


Connecting audio devices to the digital audio socket

At the back of the DVD recorder there is a digital audio output socket DIGITAL AUDIO OUT for an coaxial cable.

These can be used to connect the following:

- an AV receiver or an AV amplifier with a digital multi-channel sound decoder
- a receiver with two-channel digital stereo (PCM)



Digital multi-channel sound ?

Digital multi-channel sound offers the best possible sound quality. You will need a multi-channel AV receiver or amplifier that supports at least one of the audio formats of the DVD recorder (DTS, Dolby Digital and DTS). Consult the operating instructions for your receiver to find out which audio formats it supports.



Problem

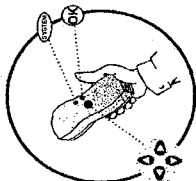
• All I can hear from my loudspeakers is a loud distorted noise
✓ The receiver is not compatible with the digital audio format of the DVD recorder. The audio format of the DVD disc is displayed in the status window when you switch to another language. Playback in six-channel digital surround sound is only possible if the receiver has a digital multi-channel sound decoder.



3

Installing your DVD recorder

Initial installation



After successfully connecting your DVD recorder to the TV set and other additional devices as described in the previous chapter, this chapter will show you how to start the initial installation. The DVD recorder automatically seeks out and stores all available TV channels.

ENGLISH

Aim correctly with the remote control

In the following sections, you will need the remote control for the first time. Aim the remote control at the DVD recorder and not at the TV set.

Connecting additional devices

If you have connected additional devices such as a satellite receiver to the aerial cable, switch them on. The automatic channel search will recognise it and save it.

No aerial connected

Even if you only want to use the DVD recorder to play back or have only connected a satellite receiver, you must still complete the initial installation. This is necessary so that the basic settings are stored correctly. Once initial installation is complete you can use the DVD recorder as normal.

Tip

Even if you only want to use the DVD recorder to play back or have only connected a satellite receiver, you must still complete the initial installation. This is necessary so that the basic settings are stored correctly. Once initial installation is complete you can use the DVD recorder as normal.

1

Virgin mode

Menu Language

English
Español
Français
Italiano
Deutsch

Press OK to continue

1

Select the desired language for the on-screen menu by pressing ▼ or ▲.

What is an on-screen menu?

The subtitles on-screen menu takes the mystery out of using your new DVD recorder. All settings and/or functions are displayed on your TV screen in the relevant language.

2

Virgin mode

Audio Language

English
Español
Français
Português
Italiano

Press OK to continue

2

Select the desired audio language using ▼ or ▲.

What is an audio language?

The DVD will play the sound in the language you select, provided the language is available on the disc. If it is not available, the DVD will play the first language available. The DVD will be set to the first language available, if available, will also be displayed in the language you select.

3

Virgin mode

Subtitle Language

English
Español
Français
Português
Italiano

Press OK to continue

3

Select the desired language for the subtitles by pressing ▼ or ▲.

What is the subtitle language?

The subtitles will be displayed in the language you select, provided the language is available on the disc. If it is not available on the disc the first language on the DVD will be used instead.

4

Confirm with OK.

4

Select the desired language for the subtitles by pressing ▼ or ▲.

7

Virgin mode

TV Shape

4:3 letterbox
4:3 panscan
16:9

Press OK to continue

7

Select the desired screen format position using ▼ or ▲. These settings will only be used if you insert a DVD that contains this information.

Which screen format can I select?

4:3 letterbox for wide-screen (cinema format) with black borders at the top and bottom of the screen.

4:3 panscan for a full-height picture with cropped edges.

16:9 for a wide-screen TV set (screen edge ratio 16:9).

8

Virgin mode

Country

Austria
Belgium
Denmark
Finland
France

Press OK to continue

8

Confirm with OK.

Select your country with ▼ or ▲.

If your country does not appear, select 'Other'.

Why do I have to set the country?

To call up the specific settings for the respective country, you must first install the country.

10

Virgin mode

Press OK to continue

10

Confirm with OK.

11

After you connect the aerial (or cable TV, satellite receiver, etc.) to the DVD recorder, press OK.

The automatic TV channel search starts. 'If it?' will appear on the display.

12

Installation

Automatic search

Searching for TV channels

00 Channels found

Bitte warten

12

* The DVD recorder cannot find any TV stations

✓ Select channel 1 on the TV set. Can you see the stored TV channel on the TV set?

✓ If not, check the cable connection from the aerial (aerial socket) to the DVD recorder and to the TV set.

✓ Please have patience.

The DVD recorder searches the entire frequency range in order to find and store the largest possible number of TV channels. It is possible that the TV channels in your country are broadcast in a higher frequency range. As soon as this range is reached during the search, the DVD recorder will find the TV channels.

✓ If no aerial is connected, complete the basic settings and then, if desired, start the automatic channel search (see section 'Automatic TV channel search').

Problem

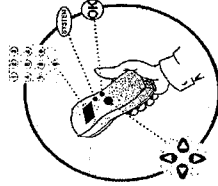
12

When the automatic TV channel search is complete, 'Autom. search complete' will appear on the TV screen.

'Time', 'Year', 'Month', 'Date' will appear on the TV screen.

Allocating a decoder

Some TV channels send coded TV signals that can only be viewed properly with a purchased or rented decoder. You can connect such a decoder (descrambler) to your DVD recorder. The following function automatically activates the connected decoder for the TV channel you want to watch.



How do I allocate the decoder for Easy Link?

If your TV set supports 'Easy Link' the decoder must be assigned to the relevant TV channel on the TV set (see the operating instructions for your TV set). Settings cannot then be made in this menu.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Use the **CHANNEL +** and **CHANNEL -** buttons on the DVD recorder or the number buttons 0-9 on the remote control to select the TV channel for which you want to use the decoder. If necessary, use the **MONITOR** button to switch to the internal tuner.
- 4 Press the **SYSTEM-MENU** button on the remote control. The menu bar will appear at the top of the screen.
- 5 Select **TV** using **◀** or **▶**.
- 6 Select line **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 7 Select line **'Manual search'** using **▼** or **▲** and confirm with **▶**.
- 8 Select line **'Decoder'** using **▼** or **▲**.
- 9 Select function **'On'** with **◀** or **▶**.
- 10 Confirm with **OK**.
- 11 To end, press **SYSTEM-MENU**.

How can I switch the decoder off again?

Select **'Off'** (decoder off) on the TV screen in the line **'Decoder'** using **▶**.

Your decoder has now been allocated to this TV channel. When this TV channel is selected, the 'DECODER' symbol will appear in the DVD recorder display.

Auto-Program Subtl.

Auto. search complete
all channels found

Time 20:01
Year 2002
Month 01
Date 01

To continue
Press OK

- 43 Check if the time in **'Time'** is correct.
- 44 If required, change the time with the number buttons 0-9 on your remote control.
- 45 Select the next line with **▲** or **▼**.
- 46 Check if the displayed settings for: **'Year'**, **'Month'** and **'Date'** are correct.
- 47 When all information is correct, save by pressing **OK**.

The initial installation is now complete.

Satellite receiver

If you are connecting a satellite receiver, please read the section on Using a satellite receiver.

Decoder

If you are connecting a decoder, you must install it as described in the next section.

Tip

* Sound may be distorted on some TV channels.

✓ If the sound is distorted on any of the stored TV channels or if there is no sound at all, the wrong TV system may have been stored for the TV channel. Read 'Manual TV channel search' for information on how to change the TV system.

Using a satellite receiver

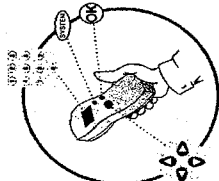
TV channels from a satellite receiver (connected to start socket **EXT 2 AUX I/O**) are received on the DVD recorder on programme number **EXT2**.

If necessary, use the **MONITOR** button to switch to the internal tuner.

Then select programme number **'EXT1'** with 0 on the remote control and programme number **'EXT2'** with **CHANNEL -**. You should select the TV channels to be received by the satellite receiver directly on the receiver itself.

Manual TV channel search

In some cases, not all of the available TV channels may have been found and stored during initial installation. In this case, you will need to search for and store the missing or coded TV channels manually.



ENGLISH

Manual search with EasyLink

With 'Easy Link', the DVD recorder will automatically download the TV channels stored on the TV set. This is why some lines have no function. To store new TV channels, they must first be stored on the TV set. The information will then be transferred to the DVD recorder automatically.

Tip

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select **TV** using **◀** or **▶**.
- 5 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 6 Select **'Manual search'** using **▼** or **▲** and confirm with **▶**.

Installation	
Manual search	
Channel/freq.	CH
Entry/search number	01
TV channel name	BBC1
Decoder	01
TV system	PAL-BG
Fine tuning	0
	To store Press OK

- 7 In 'Channel/freq.', select the desired display using **▶**.

What is hidden behind the settings?

'Freq.': Display/entry of frequencies
'CH': Display/entry of channels
'S-Off': Display/entry of special channels

What is a special channel?

TV signals are transmitted in certain pre-defined frequency ranges. These ranges are divided into channels. A specific frequency/channel is assigned to each TV station. Certain frequency ranges are specified as special channels (hyperband channels).

- 8 In 'Entry/search', enter the frequency or channel of the TV station using the number buttons **0-9**.

*I don't know the channel for my TV station

✓ In this case, press **▶** to start the automatic search. A changing channel number (frequency) will appear on the TV screen.
Continue the automatic search until you have found the TV channel you are looking for.

Problem

Using **◀** or **▶** in 'Programme number', select the programme number you want to use for the TV channel, e.g. '01'.

How can I change the displayed symbol of a TV channel?

- 1 In 'TV channel name', press **▶**.
- 2 Select the desired symbol position using **◀** or **▶**.
- 3 Change the symbol at the symbol position with **▼** or **▲**.
- 4 Select the next symbol position in the same way.
- 5 Keep pressing **▶** until the cursor disappears.

Tip

How can I change the TV system of the TV channel?

In 'TV system', use **◀** or **▶** to select the TV system that produces the least distortion of picture and sound.

What is NICAM?

NICAM is a digital sound transmission system. Using NICAM, you can transmit either 1 stereo channel or 2 separate mono channels. However, if reception is poor and the sound distorted you can turn off NICAM.

In 'NICAM', select **Off** using **◀** or **▶**.

How can I improve the automatic process for storing channels?

To change the automatic process for storing channels (fine tuning), select 'Fine tuning'.
Using **◀** or **▶** you can try to fine-tune the TV channel manually.

Experts

- 10 Press **OK** to store the TV channel.

- 11 To search for other TV channels, begin again at 10.

- 12 To end, press **SYSTEM-MENU**.

Sorting TV channels automatically (Follow TV)

When the automatic channel search function is activated, the TV channels are stored in a specific order. This may differ from the order in which the TV channels appear on your TV set. This function changes the order of the TV channels stored in your DVD recorder to match the order on the TV set.

This only works if the DVD recorder (**EXT 1 TO TV-IO socket**) and the TV set are connected with a start cable.

What does EASYLINK do?

If your TV set supports 'EasyLink', TV channels will be stored during initial installation in the same order as they appear on the TV set. To store the TV channels in a different order, you'll need to change the order on the TV set. When you start the follow TV function the information is transferred again from the TV set.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.

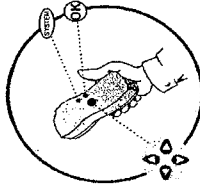
Automatic TV channel search

During installation, all available TV channels are searched for and stored. If the channel assignments of your cable or satellite TV provider change or if you are reinstalling the DVD recorder, e.g. after moving house, you can start this procedure again. This will replace the stored TV channels with the new ones.



What does Easy Link do?

With EasyLink, you can search for and store TV channels only on the TV set. These settings are accepted by the DVD recorder. Use this function to start the transfer of TV channels from the TV set.



- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 4 Select **TV** using **◀** or **▶**.
- 5 Select line **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 6 Select line **'Autom. search'** using **▼** or **▲**.
- 7 Press **▶**.
- 8 The automatic TV channel search starts. This allows the DVD recorder to save all available TV channels. This procedure may take several minutes.
- 9 When the automatic search is completed, **'Autom. search complete'** will appear on the TV screen.
- 10 To end, press **SYSTEM-MENU**.

Installation
Autom. search
Searching for TV channels
00 Channels found
Bitte warten

You can read about how to search for a TV channel manually in section 'Adding and clearing TV channels manually'.

Installing your DVD recorder

ENGLISH

- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press the **SYSTEM-MENU** button on the remote control. The menu bar appears.
- 4 Select **TV** using **◀** or **▶**.
- 5 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 6 Select **'Follow TV'** using **▼** or **▲** and confirm with **▶**.
- 7 Confirm the message on the screen with **OK**. If **TV** will appear in the DVD recorder display.
- 8 Select programme number **'1'** on the TV set.

TV 01

*1 cannot switch my TV set to programme number '1'

✓ If you have connected additional devices to the **EXT 2 AUX I/O** socket, please disconnect these devices. Other connected devices may have switched the TV set to the programme number of the start socket.

Problem

- 9 Confirm with **OK** on the DVD recorder remote control. **'01/1'** will appear on the display. The DVD recorder compares the TV channels on the TV set and the DVD recorder. If the DVD recorder finds the same TV channel as on the TV set it stores it as 'P01'.

*'01/1' will appear in the display. The DVD recorder is not receiving a video signal from the TV set.

✓ Check the connectors at both ends of the start cable.
✓ Check your TV's operating instructions to see which start socket is used for video signals.
✓ If the problem persists, you won't be able to use this feature. Please read **Sorting and clearing TV channels manually**.

Problem

Wait until for example **'1/2'** appears in the display.

Select the next programme number on the TV set, e.g. **'2'**.

Confirm with **OK** on the DVD recorder remote control.

Deleting sorting

You can delete incorrect TV channel sorting by pressing **◀**.

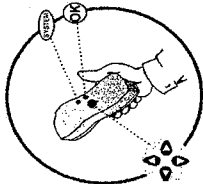
Repeat steps 10 to 12 until you have assigned all the TV channels.

To end, press **SYSTEM-MENU**.

TV 02

Installing your DVD recorder

Sorting and clearing TV channels manually



After you have performed the automatic channel search you may not agree with the sequence in which the individual TV channels have been allocated to the programme positions (programme numbers). You can use this function to rearrange the TV channels already stored or to delete TV channels you don't want or those with poor reception.



The teletext clock resets automatically

If you store a TV channel which transmits TXI/PDC on programme number '001', the date and time will automatically be transmitted and constantly updated. As a result, the changes from summer time to winter time and back again will be made automatically.

Tip

What does Easy Link do?

With EasyLink, TV channels can only be searched for and saved on the TV set. These settings are then accepted by the DVD recorder. That is why you cannot select this function manually.



- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Turn on the DVD recorder. Press the **SYSTEM-MENU** button on the remote control. The menu bar will appear at the top of the screen.
- 3 Select 'TV' using **◀** or **▶**.
- 4 Select line 'Installation' using **▼** or **▲** and confirm with **▶**.
- 5 Select the 'Sort TV channels' using **▼** or **▲** and confirm with **▶**.



Tip

Select the TV channel that you want to delete or whose order you want to change using **▼** or **▲**.

Confirm with **▶**.

Deleting TV channels

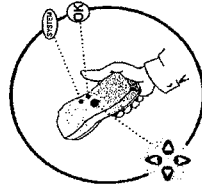
Unwanted channels or those with poor reception can be deleted using **CLEAR**. After that you can continue at step 6.

Installation	
Sort TV channels	
• P01 BBC1	
• P02 BBC2	
• P03 ITV	
• P04	
• P05	
• P06	
...	
To sort Press	
To exit press SYSTEM MENU	

Installing your DVD recorder

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Setting the language/country



You can select the country and the subtitle language as well as the audio language for DVD playback. Please observe that with some DVDs, you can change the audio language and/or subtitle language only via the DVD disc menu. Moreover, you can set one of the displayed languages for the on-screen menu (OSD). However, the DVD recorder display will only display English text regardless of this setting.

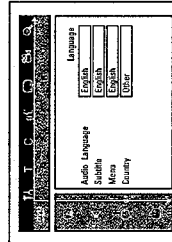
- 8 Using **▼** or **▲**, shift the TV channel to the desired position and press the **◀** button. The DVD recorder will insert the TV channel.
- 9 Repeat steps 6 to 8 until you have resorted/deleted all desired TV channels.
- 10 To save, press **OK**.
- 11 To end, press **SYSTEM-MENU**.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 4 Select the 'TV' icon using **◀** or **▶**.
- 5 Select 'Language' using **▼** or **▲** and confirm with **▶**.



Tip

Select the appropriate line and confirm with **▶**.



Which settings can I choose?
Audio Language: Playback language (audio language)
Subtitle: Subtitle language
Menu: Language of the OSD menu
Country: Location (country)

Select the appropriate setting using **▼** or **▲** and confirm with **OK**.

- 7 To end, press **SYSTEM-MENU**.

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Installing your DVD recorder

4 Information on the TV screen

You can check and change many of the features and settings on your DVD recorder using the system menu. The menu bar cannot be displayed during recording.

Icons in the menu bar

Use the **SYSTEM-MENU** button to call up and close the menu bar (main menu). You can select the appropriate feature using **◀** and **▶**. You confirm a feature using **▼**. This takes you to a submenu or executes the feature immediately. Depending on the current disc, some features may not be available.

Menu bar 1



User preferences
Title/Track
Chapter/Index
Audio language
Subtitle language
Camera angle
Zoom

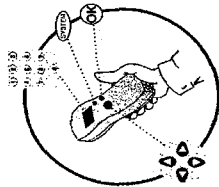
Menu bar 2

To display menu bar 2, press **▶** while menu bar 1 is displayed.

Sound
Frame-by-frame playback
Slow motion
Fast motion
Search by time

Information on the TV screen

Setting the time and date



If the display shows an incorrect time or '---', the time and date must be reset manually. If a TV channel which transmits **TXT/PDC** (teletext/PDC) is stored under programme number '901', the time and date will automatically be taken from the **TXT/PDC** information.

- 1 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 2 Select the **Time** icon using **◀** or **▶**.
- 3 Select **'Installation'** using **▼** or **▲** and confirm with **▶**.
- 4 Select **'Time/Date'** using **▼** or **▲** and confirm with **▶**.
- 5 Check if the time in **'Time'** is correct. If required, change the time with the number buttons **0..9** on your remote control.
- 6 Check **'Year'**, **'Month'** and **'Date'** in the same way. To move between the fields, use **▼** or **▲**.
- 7 Check the displayed settings and confirm with **OK**. **'Stored'** will appear briefly on the screen.
- 8 To end, press **SYSTEM-MENU**.

Installation
Time/Date
Time 20:00
Year 2002
Month 01
Date 01

To exit press
SYSTEM-MENU

Installing your DVD recorder

Temporary feedback icons

Temporary feedback icons appear in the top left hand corner of the menu bar with information on the different operating modes. This information appears briefly when certain disc features are activated :

	Shuffle, Shuffle play
	Scan
	Repeat entire disc
	Repeat title
	Repeat track
	Repeat chapter
	Repeat from A to end
	Repeat from A to B
	Camera angle
	Child lock active
	Auto resume
	Action not allowed

Status box

The status box displays the current operating mode (status) of the DVD recorder and the current disc type. This display can be switched off.

Disc type icons

	DVD-RW
	DVD-R
	DVD video
	Video CD
	No disc
	Error

Operating mode icons

	Record
	Stop
	Play
	Pause play
	Record pause
	Search forwards (8x speed)
	Search backwards (8x speed)
	Slow motion

Tuner info box

This box appears in the lower left-hand corner of the screen. The aerial signal, the TV channel and name of the TV channel are shown.

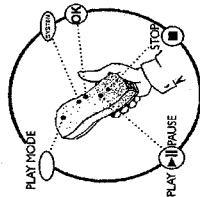
	Current channel selected input socket
	No signal TV channel is not available/additional device is not connected or is switched off
	Copy-protected signal

Timer information box

This box appears above the tuner information box. When a timer recording is set, it shows the timer icon and the start time or date of the first programme to be recorded.
If no timer recording is scheduled, the current time is displayed.
This box disappears during playback of a disc or after a recording starts.

	Timer starts on the day shown
	OTR recording runs until the stop time displayed
	Current time No timer event programmed

5 Playback



Playback hints

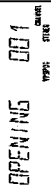
This DVD recorder will play the following systems:

- DVD video
- (Super)Video-CD disc
- DVD-RW disc
- DVD+R disc
- DVD-RW (videomode, finalised)
- DVD-R
- CD-R
- CD-RW
- Audio CD
- MP3-CD

You can operate the DVD recorder using the remote control or the buttons on the front of the DVD recorder.

Inserting a disc

- 1 Press the **OPEN/CLOSE** button on the front. The disc tray opens. The dialog box shows **OPENING** and then **TRAY OPEN**.
- 2 Insert the disc carefully into the tray, with the label uppermost and press **PLAY/PAUSE** or **OPEN/CLOSE**. The dialog box shows **CLOSING** and then **READING**. The information on the disc is read.



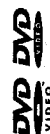
How do I insert a double-sided DVD?

Double-sided discs are not printed on either side. The labelling is in the centre on each side of the disc. The labelling of the side you wish to play must be uppermost.

Opening/closing the tray using the remote control

You can open and close the disc tray using the remote control. Press and hold the **STOP** button on the remote control until the dialog box shows **OPENING** or **CLOSING**.

- 3 Playback begins automatically.



A menu may appear during playback of a DVD. In case titles and chapters are numbered, press a number button on the remote control. You can also select a menu item using **▲**, **▼** and confirm with **OK**. For further information, read chapter 'Playing a DVD video disc'.



During the playback of a DVD-RW, the index screen overview appears. Choose the title you want to play back using **▲**, **▼**, **◀**, **▶**. Confirm with **OK**. For further information, read chapter 'Playing a DVD-RW/R disc'.



If the playback does not start automatically, press **PLAY/PAUSE** or **OPEN/CLOSE**. For further information, read chapter 'Playing an audio CD'.



If the **■** symbol appears in the display, start playback by pressing **PLAY/PAUSE** or **OPEN/CLOSE**. If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (**PREV**=**◀**, **NEXT**=**▶**) or with the number buttons **0..9**. For further information see 'Playing a (Super) Video CD'.

Playing a DVD video disc

- * **PIIT** will appear on the display
 - ✓ The child lock was activated for the inserted disc. Read section 'Access control' and 'Authorising a disc' and in chapter 'Access control (child lock)'.
- * The menu on the screen is showing an 'X'
 - ✓ Some DVD discs can be manufactured so that certain steps are required before the disc can be played, or so that only limited operation is possible during playback. When an 'X' appears on the screen the selected feature is not possible.
- * The screen is showing regional code information
 - ✓ Since DVD films are not normally released in all parts of the world at the same time, all DVD players have a specific regional code. Discs can be given a regional code. If the regional codes differ between the player and the disc, playback is not possible.
 - ✓ The regional code is shown on the label on the back of the machine.
 - ✓ The regional code does not apply to recordable DVD discs.
- * The screen is prompting me to choose an option from the menu.
 - ✓ Select the option you want using **▲**, **▼**, **◀**, **▶** or the number keys **0..9**.
 - ✓ In some cases you need to confirm with **OK**.
 - ✓ You can also access the menu using **DISC-MENU** on the remote control.



Problem



Tip

How can I access hidden information?

- 1 Press the **DISC-MENU** button on the remote control. A menu will appear on the screen. For some feature films this may appear after an introductory sequence.
- 2 Select the option you want using **▲**, **▼**, **◀**, **▶** or the number keys **0..9**. Confirm with **OK**.

Playing an audio CD

You can use your DVD recorder to play audio CDs

- 1 Insert an audio CD. Playback starts automatically.



Tip

Audio CD display

If the TV is on, the audio CD screen appears automatically. During play, the current track number and its elapsed playing time will show on the TV screen and on the recorder display.

- 2 Stop playback using **STOP**. The number of tracks and the total time are displayed.

Playing an MP3 CD

MP3 (MPEG1 Audio Layer-3) files are highly compressed music files. Using this technology the data volume can be compressed by a factor of 10. This means it is possible to record 10 hours of music in CD quality on a single CD-ROM.

When creating MP3 CDs please note the following:

Supported file system: ISO9660, Joliet

Supported formats: *.mp3

File names: maximum 64 ASCII characters (Joliet)

Maximum of 99 albums, 999 tracks

Supported sampling frequencies: 44.1kHz, 48kHz. Files with lesser than 44.1kHz will be skipped.

Supported bit rate: 32, 64, 96, 128, 192, 256 (kbps)

ID3 Tag: Version 1, i.e. if the version is higher, the directory name is used for the album and the filename for the track.

Important notes for playback:

In agreement with SDMI the digital audio output will not work during MP3 playback. Only the first session of a multi-session CD will play back.

- 1 Insert an MP3 CD. Playback starts automatically.



Tip

MP3 CD display

If the TV is on, the MP3 CD screen appears automatically. During playback, the current track number and its elapsed playing time will show on the TV screen and on the recorder display. During interrupted playback (**STOP**), the current track number will show on the TV screen and on the recorder display. If available in the so-called ID tag, more information will be displayed on album, track and artist.

- 2 Stop playback using **STOP**. The number of albums will be shown in the display.

ENGLISH

- 1 If playback does not start automatically, press **PLAY/PAUSE**.

The display shows:
title, chapter, time elapsed.

- 2 To stop the disc, press **STOP** on the remote control or **STOP** on the DVD recorder.

- 3 To eject the disc, press **OPEN/CLOSE** on the front of the DVD recorder.

Playing a DVD+RW/+R disc

- 1 If the disc is write-protected or a finalised DVD+R disc, playback starts automatically.

- 2 If playback does not start automatically, select the title you want to watch from the Index Picture Screen using **▼** or **▲**. You can also use the **144** or **▶▶** buttons on the front of the set.

- 3 Press **PLAY/PAUSE**.

The display shows:
title number, recording quality.



Problem

* I see the message "EP7515151" in the display

✓ There are no recordings on this disc.

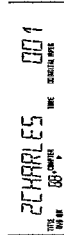
- 4 To stop the disc, press **STOP** on the remote control or **STOP** on the DVD recorder.


- 5 To eject the disc, press **OPEN/CLOSE** on the front of the DVD recorder.



What should I note when playing back different recording types (Qualities)?

The correct recording quality 'HQ(4)', 'SP+(SP+)', 'EP(EP)', 'EP+(EP+)' will automatically be selected during playback. For more information, please read section 'Selecting the recording type (Quality)' in chapter 'Manual recording'.





Tip

Additional playback features

Select the previous or next title with **◀** or **▶**.
 Choose the previous or the next album using **▲** or **▼**.
 You can also use the number buttons 0-9 on the remote control to enter the number of the album/track.

You can also use **TIC** to select titles and albums.

1 Press **TIC** and then select symbol **T** for album or **C** for title with **▶** or **◀**.
 2 Select the number of the album/title with **▼**, **▲** or with the number buttons 0-9 on the remote control.

You can also use repeat functions (Button **PLAY MODE**).

Changing to another title/chapter

If there is more than one title or chapter on the disc, follow the instructions to change to another title or chapter. If there are several chapters within the title, these will be shown. It is possible to select these titles using the menu bar.

- 1 During playback, use the **▶▶** button to move to the next title/chapter. Pressing **◀◀** takes you to the start of the current title or chapter. Pressing **◀◀** twice takes you to the start of the previous title or chapter.

Using TIC (title/chapter)

- 1 Press **TIC** (title/chapter) and select the appropriate title using **▲** or **▼**.
 Ensure that the **T** (Title) icon is selected in the menu bar.
- 2 Using **TIC** you can select chapters within the title. Press **TIC** and select the **C** (Chapter) icon using **▶**.
 Select the appropriate chapter using **▲** or **▼**.

Tip

Searching a disc

You can search the disc for a recording at 4x or 32x playback speed. Additional playback speeds are available via menu bar (▶▶).

- 1 During playback, press and hold **◀◀** (reverse) or **▶▶** (forwards) to switch to the search feature. You can switch between the playback speeds using **◀◀** / **▶▶**.
- 2 To continue playback, press **PLAY/PAUSE** **▶** II twice at your chosen location.

- ✗ No sound
- ✓ The sound is switched off in search mode. This is not a fault in your machine.

Problem

Search function via menu bar

- 1 During playback, press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the **▶▶** icon using **▶** or **◀** and confirm with **▶**.
- 3 Using **◀** or **▶** you can now select different speeds forwards or backwards.
- 4 If necessary, hide the menu bar using **SYSTEM-MENU**.
- 5 To continue playback, press **PLAY/PAUSE** **▶** II.

Tip

Playing a (Super) Video CD

(Super) Video CDs may be equipped with **PBC** (Play Back Control). This means that special playback functions (menus) can be directly selected. The Video CD must be **PBC-compatible** (see 'PBC' is turned on by default).

- 1 Insert a (Super) Video CD and press **PLAY/PAUSE** **▶** II.
 If the **■** symbol appears in the display, start playback by pressing **PLAY/PAUSE** **▶** II.
- 2 If a menu appears on the screen, use the remote control buttons indicated on the screen to select the menu option you want (PREV=◀◀, NEXT=▶▶) or with the number buttons 0-9.
 If the PBC menu contains a title list, the desired title can be chosen directly.
- 3 The **RETURN** button will take you back to the previous menu.
- 4 Stop playback using **STOP** **■**.



- 4 Confirm with OK.

* The time entered will flash
✓ The selected title is shorter than the time entered. Enter a new time or end the function using **SYSTEM-MENU**.

Problem

- 5 Playback starts before the time entered.

Repeat/Shuffle play

You can mark entire sections or the whole disc for endless playback. Depending on the type of disc (DVD video, DVD-RW, video CD) you can select a chapter, title or the entire disc.

- 1 Select the desired chapter, title or the entire disc and start playback.
- 2 During playback, press **PLAY MODE**. By pressing **PLAY MODE** again you can choose from the following options:
 1) **Chapter**: repeat chapter – DVD only
 2) **Title**: repeat title/track
 3) **Disc**: repeat entire disc (Video CD, Audio CD only)
 4) **Shuffle**: Shuffle play
 5) display disappears: no repeat
- 3 To switch off the repeat, press **STOP**.
You can also press **PLAY MODE** repeatedly until the icons disappear.

Repeat sequence (A-B)

You can repeat a certain sequence within a title/chapter. You have to mark the start and end of the desired sequence.

- 1 During playback, press at the start of the sequence **PLAY/PAUSE**.
You see a still picture.
- 2 Press **PLAY MODE** until the 'A-B' icon appears on the screen. This marks the start point.
Press **PLAY/PAUSE** to start playback.
- 3 At the desired end point, press **OK**. 'A-B' appears on the TV screen. The disc will only play between the selected points.
- 4 To switch off the repeat, press **STOP**.
You can also press **PLAY MODE** repeatedly until the icons disappear.

Additional playback features

Still picture

- 1 During playback, press **PLAY/PAUSE** to stop the disc and display a still picture.

Frame-by-frame playback via menu bar

- 1 During the still picture press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the 'Still' icon using **▶** or **◀** and confirm with **▼** button.
- 3 Using **◀** or **▶** you can now scroll back or forwards one frame at a time.
- 4 If necessary hide the menu bar using **SYSTEM-MENU**.
- 5 To continue playback, press **PLAY/PAUSE**.

Tip

Slow motion

- 1 During playback, press **PLAY/PAUSE** on the remote control. Then hold down **◀** or **▶** to switch to slow motion.
- 2 You can choose between the various speeds using **◀** or **▶**.

Slow motion over the menu bar

- 1 During playback press **PLAY/PAUSE** on the remote control and then press **SYSTEM-MENU**. The menu bar will appear at the top of the screen.
- 2 Select the 'Slow' symbol using **▶** or **◀** and confirm with **▼**.
- 3 Using **◀** or **▶** you can now select various slow motion speeds backwards or forwards.
- 4 If necessary hide the menu bar using **SYSTEM-MENU**.

Tip

- 3 To continue playback, press **PLAY/PAUSE** twice.

Search by time

Using this feature you can select where playback should start (select elapsed time).

- 1 During playback press **SYSTEM-MENU** on the remote control. The menu bar will appear at the top of the screen.
- 2 Select the 'Time' symbol using **▶** or **◀** and confirm with **▼**. Playback is stopped and a box appears on the screen showing the elapsed time.
- 3 Enter the start time with the digit keys 0-9 from where playback should start.

Additional playback features

Scan feature

This feature plays back the first 10 seconds of each chapter (DVD) or track (CD).

- 1 During playback, press **PLAY MODE**. Select "scan" using **PLAY MODE**.
- 2 After 10 seconds the DVD recorder switches to the next chapter/index. To start playback at the corresponding chapter/index, press **STOP** and then **PLAY/PAUSE**.

Zoom feature

The Zoom feature allows you to enlarge the video image and pan through the enlarged image.

- 1 During playback, press **PLAY/PAUSE**. The DVD recorder switches to "PAUSE". You will see a still picture.
- 2 Press **SYSTEM-MENU** and select the "Q" icon using **▶**.
- 3 Select the required zoom factor using **▼** or **▲**.
- 4 When "press OK to pan" appears on the screen, the zoom process is complete.
- 5 Press **OK**. Using **▲**, **▼**, **▶**, **◀** select the part of the image you wish to view.
- 6 Confirm with **OK**.
- 7 To stop the feature, press **PLAY/PAUSE** then **SYSTEM-MENU**.

Camera angle

If a DVD video contains sequences recorded from different camera angles you can change the camera angle for playback.

- 1 During playback, press **PLAY/PAUSE**. You will see a still picture.
- 2 Press **SYSTEM-MENU** and select the "CA" icon using **▶**.

*The "CA" icon is not visible

✓ The selected scene was not recorded from different camera angles. That is why you cannot select this feature. For more information please read the "cover text" on your DVD video disc.

Problem

Changing the audio language

Pre-recorded DVD videos often come with multiple audio languages. Playback uses the language you selected during initial installation. You can change the audio language of the current disc at any time. You can change the audio language either using the menu of the inserted disc (**DISC-MENU** button) or the menu bar (**SYSTEM-MENU** button). The audio languages for DVD playback in the two menus may be different.

- 1 During playback press **SYSTEM-MENU** and select the "L" icon using **▶**.
- 2 Select the required audio language using **▼** or **▲**. You can also enter the number directly using the number buttons 0-9.
- 3 Play continues in the new audio language.

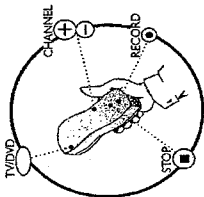
Subtitles

Pre-recorded DVD videos often come with subtitles in several languages. Playback uses the language you selected during initial installation. You can change the subtitle language of the current disc at any time. You can change the subtitle language either using the menu of the inserted disc (**DISC-MENU** button) or the menu bar (**SYSTEM-MENU** button). The subtitle languages in the menus may differ.


- 1 During playback press **SYSTEM-MENU** and select the "S" icon using **▶**.
- 2 Select the required subtitle language using **▼** or **▲**. You can also enter the number directly using the number buttons 0-9. You can switch off subtitles again with 0 or by pressing **off**.
- 3 Playback continues in the new subtitle language.

7

Manual recording



General information



Which discs can I use for recording?


DVD+RW
With this DVD recorder, you can record on two types of DVD:
This disc can be written to and then the contents deleted.

DVD+R
This type of disc can only be recorded once.
If you want to play this DVD in a DVD player it must be finalised using the 'Finalise disc' function. It is not possible to make further recordings using this disc.
If this disc is to be played in a DVD recorder it must not be finalised. Recordings can be added and deleted. The disc space (playback time) from the deleted recording cannot be recovered for further recordings.

Use the 'Manual recording' feature to spontaneously start recording (e.g. to record a TV show already in progress).

▲ In the 'Index Picture screen' select the title to be overwritten or 'Empty titles' using ▼ and ▲.

If you want to record between existing recordings, check the length of the old recording and the length of the new recording. If the new recording is too long, the following recording (title/chapter) will be overwritten.



Tip

Insert new recordings at the end of all existing recordings (Safe Record)
To add a new recording at the end of the last recording on the disc, hold down the **REC/PAUSE** button until the message **SAFE RECORD** appears on the display.
For DVD+R, discs each new recording is always added at the end of all previous recordings as existing recordings cannot be overwritten.

If you want to start and stop a recording manually, read 'Recording without automatic switch-off'.


If you want to start a recording manually but stop it automatically, read 'Recording with automatic switch-off' (e.g. not to record to the end of the disc).

Read 'Automatic recording from a satellite receiver', if you want a recording to be controlled automatically by a satellite receiver.

Read 'Direct record' if you want to record a programme currently being shown.

Recording without automatic switch-off

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Insert a disc to be used for the recording. The system and content of the disc will be checked. **READY** will appear on the display.

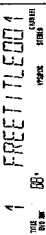



***Index display**
✓ A DVD+RW disc was inserted that already contains recordings. Use ▲ and ▼ to select a location where the recording should be started.
* **EMPTY DISC** appears in the display
✓ The inserted DVD disc is empty.

***A dialog box appears asking if the contents should be erased or the disc should be ejected**
✓ The inserted disc is a DVD+RW disc whose contents are not compatible with DVD Video (e.g. a data disc). This disc cannot be used for recordings until the entire disc is erased using the **REC/PAUSE** button.

***Too many titles** appears on the screen when a recording is attempted
✓ A disc can only contain a max. of 48 titles (including the empty titles). Erase the titles or change the disc.

- 3 If necessary, switch to the internal tuner on the DVD recorder using the **MONITOR** button on the remote control.
- 4 Select the programme number (station name) you wish to record using **CHANNEL +** or **CHANNEL -**. The following will appear on the display:





Station name
If a TV station transmits a station name it will be shown in the display.

Programme number of the external inputs
EXT 1 Start socket at the back **EXT 1 TO TV-IO**
EXT 2 Start socket at the back **EXT 2 AUX I/O**
EXT 3 S-VIDEO/Audio front sockets **S-VIDEO / left AUDIO right**
EXT 4 Video/audio front sockets **AV VIDEO / left AUDIO right**
Switching between sockets S-VIDEO and VIDEO is done automatically. In case both sockets are used, the signal received at socket S-VIDEO is treated with priority.

EXT 5 Digital Video (i Link) front socket **DV**

Tip

Recording with automatic switch-off (OTR) - One Touch Recording

- 1 Insert a disc.
- 2 Use **CHANNEL +** or **CHANNEL -** to select the programme number (channel name) you want to record.
- 3 Press **REC/OTR** on the remote control.
- 4 Each time you press **REC/OTR** you will add 30 minutes to the recording time.

How can I cancel the recording time I have just set?

To cancel the entry, press the **CLEAR** button while the recording time is displayed.

Protecting the disc against accidental recording

To prevent an important recording from being accidentally erased, you can protect the entire disc. You can only protect the disc as a whole. It is not possible to protect an individual recording.

What happens with DVD-R discs?

As long as these discs are not finalised, they can be protected against accidental erasure in the same way as DVD+RW discs.

- 1 Insert the disc you wish to protect.
- 2 Press **DISC-MENU**. The Index Picture Screen appears.
- 3 While the Index Picture Screen is displayed, press the **STOP** button on the remote control. The first title is marked.
- 4 Press **▲**. This takes you to the disc info screen.
- 5 Press the **▶** button. Select 'Protection'. Confirm with **▶**.
- 6 Select 'Protected' using **▼** and confirm with **OK**.
- 7 Quit using **◀** and then **DISC-MENU**.

ENGLISH

- 5 To start recording, press **REC/OTR** on the remote control or **RECORD** on the DVD recorder. If you want to start the recording at the end of the existing recordings, hold down the **REC/OTR** button until the message 'SAFE RECD' appears on the display.

For DVD+R discs each new recording is always added at the end of all previous recordings as existing recordings cannot be overwritten. On the display will appear e.g.:

5 1 1:55:1 00:1
TIME TIME REMAINING
50:00 1:55:1 00:1
REMAINING TIME
COUNT

Inserting chapter markers

During recording it is possible to mark scenes that you want to see or hide later. During recording press **EDIT** at the relevant location. The screen displays 'Inserting marker'. The 'CHAPTER' number is increased by one in the display box. For more information on titles and chapters please see the section 'Changing to another title/chapter' in the chapter 'Playback'.

- 6 You can stop recording by pressing **STOP** on the remote control or **STOP** on the recorder. **PAUSE** will appear on the display. The DVD player is preparing the list of contents. Wait until this message disappears in the display, then the recording is completed.

* The display will read 'TIME ERR'

✓ The recording could not be completed correctly because of a disc error. Check and, if necessary, clean the inserted disc.

Making recordings on DVD+R discs compatible

If you want to play back the recording on a DVD player, you need to finalise the disc in the DVD recorder. You can prepare your DVD for use in a DVD player using the 'Finalising' feature. See the section 'Finalising DVD+R discs' in chapter 'Managing the disc contents'.

Interrupt recording (Pause)

- 1 During recording press **PLAY/PAUSE**, for example to avoid recording the commercials.
- 2 To continue recording, press **REC/OTR**.

End recording

To end the recording, press the **STOP** button. Wait until 'PAUSE' disappears from the display.

Selecting the recording mode (quality)

By selecting a recording mode, you define the picture quality of recordings and the maximum recording time for a disc.
You can check the quality by switching to a recording mode and then watch the picture via the built-in tuner (MONITOR button).
For playback, the correct picture quality will automatically be selected.


- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 On the front of the DVD recorder select the recording quality using **REC MODE**.
You can also use the button **REC. MODE** on the remote control.

Which recording type can I choose?
HQ/HQ+ HighQuality offers the best picture quality and a recording time of 60 minutes.
SP+SP+ StandardPlay (pre-recorded DVD quality) offers excellent picture quality with a recording time of 150 minutes.
EP+EP+ ExtendedPlay (better than VHS quality). Recording time 240 minutes.
EP+EP+ 6 hours (VHS picture quality). Recording time 360 minutes.

Can I select the recording type via a menu as well?

- 1 Press the **SYSTEM-MENU** button.
- 2 Select the symbol with **◀** or **▶**.
- 3 Select **Record settings** using **◀** or **▶** and confirm with **▶**.
- 4 In the line **Rec Mode** select the recording type with **Y** or **▲**.
- 5 Confirm using **OK** and **SYSTEM-MENU**.
- 6 If you have selected the recording type **EP+EP+** or **EP+EP+**, you can select the settings **Standard** (Standard) or **Sport** (fast movements) in the **Filter mode** line.

Tip



Automatic recording from a satellite receiver (Sat Recording)

You can use this feature if you own a satellite receiver that can control other devices via a start cable and a programming feature (Timer). For more information, please see the operating instructions for the satellite receiver.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **SYSTEM-MENU** on the remote control. The menu bar appears.

ENGLISH

Lining up recordings within a title (assemble cut)


The entire disc is now protected. If you try to record onto this disc the message 'Disc locked' will appear in the display and 'Disc locked' on the screen.

You can add further recordings to a title already contained on a DVD+RW disc. This recording will be added to the title as a so-called 'chapter'. Existing information will be overwritten from this location onward. Depending on the length of the recording, this will also overwrite titles that follow the current title. The recording mode (quality) is automatically transferred from the current title.

To play back this recording, press **SYSTEM-MENU** and select **C** (chapter) using **▶**. You can also use **T/C**.

For more information, read section 'Changing to a different title/chapter' in chapter 'Playback'.

What happens with DVD+R discs?
New recordings on DVD+R discs can only be added after existing recordings. It is not possible to overwrite existing recordings on DVD+R discs.



- 1 Find the title in the Index Picture Screen where you want to insert the new recording.
- 2 Look at the last minute of the old recording (playback).
- 3 Press **PLAY/PAUSE** on the remote control at the position where the new recording is to go. 'II' will appear on the display.
- 4 To monitor the recording you can switch to the internal tuner using **MONITOR**.
- 5 Now start recording as usual by pressing **REC/OTR** on the remote control.
The new recording will be inserted.
- 6 Stop recording with **STOP**.

- 3 Select **PA** using **◀** or **▶**.
- 4 Select line **'Record settings'** using **▼** or **▲** and confirm with **▶**.
- 5 Select **'Sat record'** using **▼** or **▲**.
- 6 Select **'EXTZ'** with **◀** or **▶**.

Switching off 'Sat Recording'

To switch off the feature, select **'Off'** using **▶** or **◀**.

Confirm with **OK**.

- 8 Use a start cable to connect the start socket **EXT 2 AUX I/O** on the DVD recorder to the corresponding start socket on the satellite receiver.

Quit using **SYSTEM-MENU**.

Insert a disc that you want to use for recording.

- 11 Programme the satellite receiver with the required information (programme number of the TV channel, start time, end time). If necessary, please see the operating instructions for your satellite receiver.

- 12 Switch off the DVD recorder with **STANDBY** **⏻**. **'S'** appears in the display to show the activated feature.

The DVD recorder is now ready to record. The beginning and end of the recording is controlled via the start socket **EXT 2 AUX I/O**.

'Direct Record'

Can I instantly record the TV channel I want, even though the DVD recorder is switched off? No problem. If recording is started manually, the DVD recorder, when it is switched off, is set to the current TV channel on the TV set using the start cable. You will find more information on how to switch 'Direct record' on or off in the next section 'Direct Record'.

How does Direct Record work?

The DVD recorder uses the start cable to compare the TV channel selected on the TV set with its stored TV channels. If the same TV channel is found, the DVD recorder switches to the corresponding programme number and starts recording.

During this search please do not change the TV channel on the TV. This may affect the ending of the DVD recorder.

- 1 On the TV set, select the programme number you want make the recording from.
- 2 Press **REC/OTR** with the DVD recorder switched off.

***'S' will appear on the display.**

✓ The DVD recorder is comparing its stored TV channels with those on the TV set. Please do not change the TV channel on the TV set while **'S'** is displayed.

***'EXTZ' appears in the display**

✓ This TV channel could not be found in the DVD recorder's memory. Check that all the TV channels stored on the TV set are available on the DVD recorder. If necessary, store any missing channels. Please read paragraph 'Manual TV channel search' in the chapter 'Installing your DVD Recorder'.

✓ Check the connectors at both ends of the start cable.

✓ Check your TV's operating instructions to see which start socket is used for video signals.

✓ If the problem persists you won't be able to use this feature.

Problem

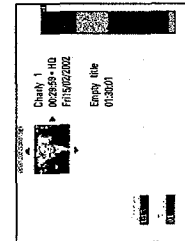
STOP ■

Switching 'Direct Record' on or off

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- 3 Select **PA** using **◀** or **▶**.
- 4 Select **'Record settings'** using **▼** or **▲** and confirm with **▶**.
- 5 Select **'Direct Record'** using **▼** or **▲**.
- 6 Select **'On'** (Direct Record on) or **'Off'** (Direct Record off) using **◀** or **▶**.
- 7 Confirm with **OK**.
- 8 Quit using **SYSTEM-MENU**.
- 9 Switch off with **STANDBY** **⏻**.

8

Managing the disc contents



General Information

When a recording is made to disc, the following additional information is also stored at the beginning of the recording:

- 1) Name of the recording
- 2) If the TV station does not transmit a name, only the channel number and time will be stored as the name
- 3) Length of the recording
- 4) Record type (Quality)
- 5) Date of the recording
- 6) Index picture of the recording

A marker will be set every 5-6 minutes if the 'Auto chapters' function is activated in the 'Record settings' menu. This marker is known as a 'chapter'. These markers can be changed when the recording has finished.



Can markers be set on a DVD-R disc?
Markers can be set on these discs if they have not been finalized.

It is also possible to add 'chapters' later. This means that scenes you do not want to see during playback, such as commercials, can be hidden or skipped. During playback you can watch your recording as a continuous sequence without the hidden chapters.

Read section 'Disc settings' to change general settings of the disc.

Read 'Editing recording titles (name)' to find out how to change a name.

Read 'Playing back titles' to find out how to play back the entire recording including the hidden chapters.

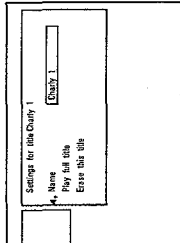
Read 'Erasing a recording title' to find out how to erase titles and the accompanying recording.

Read 'Favourite scene selection' to find out how to split the title into chapters and how to manage the chapters.

Editing recording titles (name)

Some TV stations transmit the title (name) of a programme. In this case, the name will be included automatically (e.g. 'ROCKY'). Otherwise, the channel number and time of the recording are stored as the name. The name of the recording can only be changed after the recording has been completed.

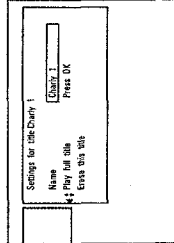
- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title whose name you want to edit and confirm with **▶**. The menu for editing names appears.
- 3 Select 'Name' using **▲** or **▼** and confirm with **▶**.
- 4 Using **▶** or **◀** select the position where the letter/number/icon is to be changed/re-entered.
- 5 Change the icon using **▲** or **▼**. You can switch between upper and lowercase using **SELECT**. You can delete the character using **CLEAR**.
- 6 Repeat 4 and 5 until you have made the changes you want.
- 7 Save the new name with **OK**. 'Storing name' appears on the TV screen for confirmation.
- 8 To end, press **◀**.



Playing back titles

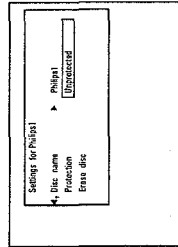
If you have hidden certain chapters of a title, with this setting you can view the entire title including the hidden chapters. Proceed as follows:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title that you want to play back and confirm with **▶**. The menu for editing titles appears.
- 3 Select 'Play full title' using **▲** or **▼** and confirm with **OK**.
- 4 Playback begins automatically. The full title - including the hidden chapters - is played back.



Changing the disc name

- 1 In the Disc Info screen press **▶**. The 'Settings for' menu appears on the TV screen.
- 2 Select 'Disc name' using **▲** or **▼** and confirm with **▶**.
- 3 Using **▶** or **◀** select the position where the letter/number/icon is to be changed/re-entered.
- 4 Change the icon using **▲** or **▼**. You can switch between upper and lowercase using **SELECT**. You can delete the character using **CLEAR**.
- 5 Repeat **3** and **4** until you have made the changes you want.
- 6 Save the new title with **OK**. 'Starting name' appears on the TV screen for confirmation.
- 7 To end, press **◀**.



Finalising a disc

Even if one or more titles have been edited, a DVD player may still show the original title. You can prepare your disc so that a DVD player will be able to read the edited title.

- 1 In the Disc Info screen press **▶**. The 'Settings for' menu will appear on the screen.
- 2 Select 'Make edits compatible' using **▲** or **▼** and confirm with **OK**.



Problem

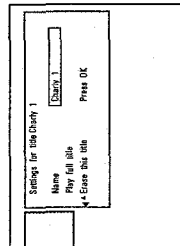
* 'Make edits compatible' does not appear
✓ Your disc is already compatible. No conversion is necessary.
To end, press **SYSTEM-MENU**.

- 3 The screen displays 'This will take...' to show how long the process will last.
- 4 To confirm press **OK**. The screen will show 'Working...'. A bar will move from left to right indicating the progress of the conversion.

Erasing a recording/title

You can erase individual recordings from a disc. Follow the instructions below:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Using **▲** or **▼** select the title to be erased and confirm with **▶**. The menu for editing titles appears.
- 3 Using **▲** or **▼** select 'Erase this title' and confirm with **OK**. The screen will show 'This will completely erase this title'. Press **OK to confirm**.
- 4 If you want to erase the title press **OK**. To end, press **◀**.
- 5 The screen will show 'Erasing title'.
- 6 'Empty title' will now appear in this position in the Index Picture Screen. A new recording can now be made at this position. If the deleted title was very short (shorter than 1 minute) no 'Empty title' will be displayed.



Can titles be deleted from a DVD-R disc?

Titles on DVD-R discs are only marked as deleted. 'Deleted title' will appear in the display instead of 'Empty title'. During playback the 'deleted' title is skipped. The space used for this title cannot be used again as the title has not been physically deleted. Once the disc has been finished no further changes can be made.

Disc settings

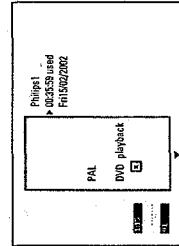
This screen appears before the first title and contains general information about the current disc.

You can:

- change the name of the disc
- activate or deactivate write protection on the disc
- Finish editing (make edits DVD compatible)
- Finalising DVD-Rs
- Erasing DVD-RWs

Follow the instructions to get to this screen:

- 1 Press the **STOP** button or during playback press **DISC-MENU**.
- 2 Select the first title using **▲** or press **STOP**.
- 3 Press the **▶** button. The Disc Info screen will appear.



Finalising DVD+R discs

This feature is required to play back a DVD+R disc in a DVD player. Once the disc has been finalised no further recordings or changes can be made.

- 1 In the Disc Info screen press **▶**. The 'Settings for' menu appears on the TV screen.
- 2 Select 'Finalise disc' using **▲** or **▼**, and confirm with **OK**.

Problem

* 'Finalise disc' does not appear
✓ Either there is no DVD+R disc inserted or the disc is already finalised.
To end, press **SYSTEM-MENU**.

* 'Settings for' does not appear
✓ If the disc has been recorded on another DVD recorder, the menu may not appear. In this case, use the 'Finalise disc' feature in the **TV** menu, under 'Features'.

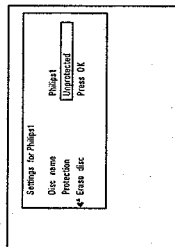
- 3 The screen displays 'This will take' to show how long the process will last.
- 4 To confirm press **OK**. 'Working' appears on the TV screen. A bar will move from left to right indicating progress.

Erasing DVD+RW disks

- 1 In the Disc Info screen press **▶**. The 'Settings for' menu will appear on the screen.

- 2 Select 'Erase disc' using the menu buttons **▲** or **▼**. Confirm with the menu button **OK**. The screen will show 'This will erase all titles Press OK to confirm'.

- 3 If you want to erase all titles press **OK**. Otherwise press **◀** to end.
- 4 The screen will show 'Erasing disc'.
- 5 Once the disc has been successfully erased the Index Picture Screen will show the empty area of the disc.



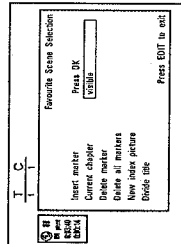
Favourite Scene Selection

In this menu, you can adjust a title to your personal preferences. You can insert/delete chapter markers, hide chapters, select a new index screen, or split the title. Display this menu during playback using **EDIT** on the remote control.

Inserting chapter markers

During playback you can set and erase chapter markers within a title. The maximum number of chapters per disc is 124 and 99 per title. If one of these numbers are reached, the following message appears: 'Too many chapters'. Some markers must be erased before new markers can be added.

- 1 During playback press **EDIT** on the remote control at the appropriate position. The 'Favourite Scene Selection' menu will appear on the screen.



- 2 Confirm 'Insert marker' using **OK**. The screen displays 'Inserting marker'.

'X' will appear on the screen:

This DVD is write-protected or the disc is a finalised DVD-R. Subsequent changes cannot be made.

- 3 To stop the feature, press **EDIT**.

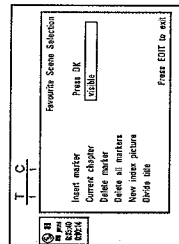


Tip

Hiding chapters

By default all chapters are visible. Chapters (such as commercials) can be hidden during playback or made visible again. In editing mode, hidden chapters are shown grayed out.

- 1 During playback of the appropriate chapter, press **EDIT** on the remote control. The 'Favourite Scene Selection' menu will appear on the screen.



How do I select other chapters?

- 1 Press **TIC** on the remote control. The title and chapters are shown at the top of the screen.
- 2 Using **▶** or **◀** select Title(T) or Chapter (C).
- 3 Using **▲** or **▼** select the title or chapter you wish to edit.

- 2 Select 'Current chapter' using **▼**.



Tip

- 3 Select line 'New Index picture' and confirm with OK.
- 4 Start the change with OK. 'Updating menu' appears on the TV screen.

Once the revision has been completed successfully the DVD recorder reverts to the index overview.

Dividing titles

It is possible to divide a title into several separate parts (titles). Each of these parts (titles) is indicated by a separate index picture.

Please note: This division cannot be reversed



Can I also divide titles on DVD-R discs?
As recordings on DVD-R disc cannot be overwritten, it is not possible to divide titles.

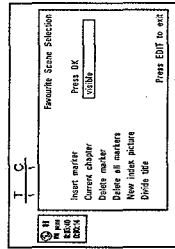
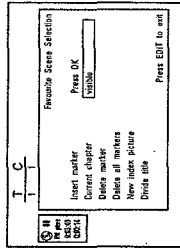
- 1 During playback of the appropriate title press EDIT on the remote control. The 'Favourite Scene Selection' menu will appear on the screen

- 2 Select 'Divide title' and confirm with OK.

If you are sure, start the process by pressing OK. The screen will show 'Dividing title'.

- 4 Wait until the new title appears with an index picture in the Index Picture overview.

The title is now successfully divided.



- 3 Using ► select 'hidden'. The picture is shown darker.



Tip

Switching quickly
You can switch between show chapters (Visible) and hide chapters (hidden) quickly and easily using SELECT.

- 4 To end, press EDIT.

During playback this chapter will be skipped.
If the chapter is not visible, select 'visible' in step 3 with ►.

Erasing chapter markers

You can erase all or some of the markers within a title.

- 1 During playback of the appropriate chapter press EDIT on the remote control. The 'Favourite Scene Selection' menu will appear on the screen



Tip

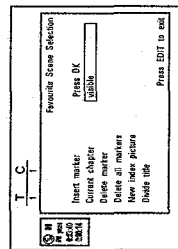
How do I select other chapters?

- 4 Press 'TIC' on the remote control. The title and chapters are shown at the top of the screen.
- 2 Using ► or ◀ select Title(T) or Chapter (C).
- 3 Using ▲ or ▼ select the title or chapter you wish to edit.

- 2 Using ▼ select 'Delete marker' for this chapter or 'Delete all markers' for all chapters within the selected title.

- 3 Confirm with OK.

- 4 To end, press EDIT.



Changing the index picture

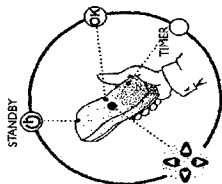
Normally the first picture of a recording is used as the index picture. You can however choose any picture from the recording as the index picture.

- 1 During playback, search for location of the new index picture. Press the PLAY/PAUSE-II button.

- 2 Press the EDIT button. The 'Favourite Scene Selection' menu appears on the TV screen.

9

Programming a recording (TIMER)



General information

Use programmed recording (TIMER) to automatically start and stop a recording at a later date. The DVD recorder will switch to the right program number and begin recording at the correct time.

With this DVD recorder, you can pre-program up to 6 recordings within a period of one month.

To make a programmed recording, your DVD recorder needs to know:

- the date you want to make the recording
- the program number of the TV channel
- the start and stop time of the recording
- VPS or PDC on or off
- the recording mode (HQ/SP/LP/EP+).

This information is saved in a TIMER block.

What is VPS/PDC?

VPS (Video Programming System)/ PDC (Programme Delivery Control) are used to control the start and duration of TV channel recordings. If a TV programme starts earlier or ends later than was scheduled, the DVD recorder will still switch itself on and off at the correct times.

What do I need to know about VPS/PDC?

Usually the start time is the same as the VPS or PDC time. But if your TV guide gives a VPS or PDC time which is different from the programme's start time, e.g. '20.15 (VSP/PDC 20.14)', you must enter the VSP/PDC time '20.14' exact to the minutes as the start time.

If you want to programme a time that is different from the VPS or PDC time, you must switch off VPS or PDC.

Only one TV programme on a TV channel can be controlled using VSP/PDC at a time. If you want to record two or more TV programmes on a TV channel using VSP/PDC, you will need to programme these as two separate recordings.



SHOWVIEW

Programming a recording (with 'ShowView ®')

Thanks to this programming system, you no longer need to tediously enter the date, programme number, start and end times. All the information needed by the DVD recorder for programming is contained in the ShowView® - programming number. This 9-digit ShowView® - number is found in most TV listings magazine.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **TIMER** on the remote control.
The programming method last selected is marked.
- 3 Select **ShowView programming** using **▼** or **▲** and confirm with **▶**.

Enter the entire ShowView number. This number is up to 9 digits long and can be found next to the start time of the TV programme in your TV listings magazine.
e.g.: 5-312-4 or 5 312 4
Enter 53124 for the ShowView number.
If you make a mistake, you can clear it with **CLEAR**.



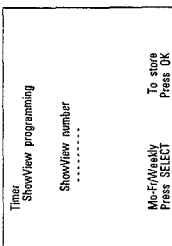
Tip

Selecting daily/weekly recordings

Using **SELECT**, select from the following options:

'Mo-Fr': Repeated daily recordings from Monday to Friday.
'Weekly': Repeated weekly recordings (every week on the same day).

Confirm with **OK**.



x The following message appears on the screen: **'Please enter programme number'**

✓ The programme number of the TV channel has not yet been assigned to the ShowView number. Using **▶** and **▲** or the number buttons 0-9 on the remote control, select the corresponding programme number (name) of the TV channel and confirm with **OK**.

x The following message appears on the screen: **'ShowView number wrong'**

✓ The ShowView number entered is incorrect. Correct your entry or cancel using the **SYSTEM-MENU** button.

✓ Check the time/date (see 'Setting the time and date' in 'Installing your DVD recorder').

x The following message appears on the screen: **'Weekend programming not possible'**

✓ A daily recording was entered for the wrong day. Daily programming can only be used for recordings to be made from Monday to Friday.



Problem

Programming a recording (without ShowView®)

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **TIMER** on the remote control.
The programming method last selected is marked.
- 3 Select 'Timer programming' with **▼** or **▲**, and confirm with **▶**.
The current information will appear on the screen.
- 4 Select the input field with **◀** or **▶**.
- 5 Enter information with **▼** or **▲** or with the number buttons 0-9.

Timer programming		Rec Mode
Date Prog.	Start	End
01	2015	2130
Mo-Fri/Weekly		To store
Press SELECT		Press OK

Tip

Selecting daily/weekly recordings

In 'Date' use **SELECT** to select from the following options:
 'Mo-Fri': Repeated daily recordings from Monday to Friday
 'Mo-Sa': Repeated weekly recordings (every week on the same day, e.g. Monday).
 You can also programme recordings from external sources via start socket EXT 1 TO TV-IO (EXT1) or EXT 2 AUX IO (EXT2).
 Switching on 'VPS/PC' in the 'Start' input field
 Select the 'Start' input field using **TIMER**. Using **SELECT** switch on 'VPS/PC' (* lights up). If you press **SELECT** again, you will switch 'VPS/PC' off (* disappears).
 Changing the recording quality in the 'End' input field
 Select the 'End' input field using **TIMER**.
 Using **SELECT**, select the recording mode 'HQ, SP*, EP*, EP*'.
 If all the information is correct, press **OK**. The programming information is stored in a **TIMER** block.

- 6 If all the information is correct, press **OK**. The programming information is stored in a **TIMER** block.
- 7 To end, press **TIMER**.
- 8 Load a DVD (unprotected) ready for recording.
The cassette is being checked.
- 9 Switch off with **STANDBY** .
The programmed recording will only function properly if the DVD recorder has been switched off using the **STANDBY** button.

If any of the **TIMER** blocks are in use, will light up on the display.

The decoded information appears after confirmation. You can go back at any time to change the information. Select the appropriate input field using **▶** or **◀**. If required, change the information using **CHANNEL +**, **CHANNEL -** or the number buttons 0-9.


Timer ShowView programming		Rec Mode
Date Prog.	Start	End
01	2015	2130
Mo-Fri/Weekly		To store
Press SELECT		Press OK

- 6 The decoded information appears after confirmation. You can go back at any time to change the information. Select the appropriate input field using **▶** or **◀**. If required, change the information using **CHANNEL +**, **CHANNEL -** or the number buttons 0-9.
- 7 Switching on 'VPS/PC' in the 'Start' input field
Select the 'Start' input field using **▶**. Using **SELECT** switch on 'VPS/PC' (* lights up). If you press **SELECT** again, you will switch 'VPS/PC' off (* disappears).
- 8 Changing the recording quality in the 'End' input field
Select the 'End' input field using **▶**. Using **SELECT**, select the recording mode 'HQ, SP*, EP*, EP*'.
If all the information is correct, press the **OK** button. The programming information is stored in a **TIMER** block.
- 9 To end, press **TIMER**.
- 10 Load a DVD (unprotected) ready for recording.
The current disc is checked.
- 11 Switch off with **STANDBY** .
The programmed recording will only function properly if the DVD recorder has been switched off using the **STANDBY** button.

If any of the **TIMER** blocks are in use, will light up on the display.

How to check, change or delete a programmed recording (TIMER)

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Press **TIMER** on the remote control.
The programming mode last selected is marked.
- 3 Select 'Timer List' with **▼** or **▲**, and confirm with **▶**.
- 4 Select the programmed recording (TIMER) you want to check, change or delete with **▼** or **▲**.



Tip

Delete programmed recording

- 1 Press the **CLEAR** button.
- 2 Confirm with **OK**. 'Timer Cleared' will briefly appear on the TV screen.
- 3 '...' appears rather than the displayed values
- 4 To end, press **TIMER**.

Timer List

Date Prog.	Start	End	Rec Mode
01	20:15	21:30	SP

Total record time 00:20

To change Press **▶** To exit Press **TIMER**

- 5 Press **▶**.
Select the input field with **▲** or **▼**.
If required, change the information with **CHANNEL -** or the number buttons 0-9.
- 6 Confirm with **OK**.
- 7 To end, press **TIMER**.
- 8 Switch off with **STANDBY ○**.

'NexTVView Link'

This DVD recorder is equipped with the 'NexTVView Link' function. If your television is also equipped with this feature, you can mark TV programmes on the television for programming. These TV programmes will automatically be transmitted to a TIMER block on the DVD recorder. If you clear this marking on the television, the corresponding TIMER block on the DVD recorder will also be cleared.

For more information, read the instruction manual for your TV set.

Problem solving for programmed recordings

PROBLEM	SOLUTION
DVD recorder is not responding	✓While a programmed recording is being made, you cannot operate your recorder manually. If you want to cancel the programmed recording, press STANDBY ○ .
'Switch off, timer recording' flashes on the TV screen.	✓The DVD recorder was switched on several minutes before the start of a programmed recording. Switch off the DVD recorder with STANDBY ○ . A programmed recording (timer) will only function if the DVD recorder is switched off (button STANDBY ○).
Error message: 'Insert recordable disc'	✓Either no disc has been inserted or you cannot record to this disc. Insert a disc that you can record onto. Switch off the DVD recorder using STANDBY ○ .
The error message 'Disc locked' appears briefly on the screen.	✓A write-protected disc has been inserted. Cancel the protection (see 'Preventing accidental erasing of discs' in 'Manual Recording') or insert a different disc.
Error message: 'Memory full'	✓If this error message appears after pressing TIMER , then all the TIMER blocks are already programmed. No more recordings can be programmed. Press the ▶ button. If you want to clear or check a programmed recording (TIMER block), select it with CHANNEL + or CHANNEL - .
The 'Data error' message appears on the screen.	✓The data for the recording could not be transferred. Please check the date start time and end time of the programmed recording.
'Collision' appears on the screen.	✓The information for two programmed recordings overlap. ✓If you ignore this error message the TV programme with the earlier start time will be recorded first. You will miss the start of the second programme. ✓Change the information for one of the recordings. ✓Delete one of the recordings.

10 User preferences

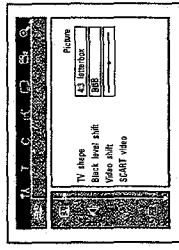
In this section you will learn how to set your user preferences on the DVD recorder. The symbols have the following meanings:

- Picture setting
- Sound setting
- Language setting
- Additional settings
- Remote control settings
- Recording settings
- Installation

- Switch on the TV set. If required, select the programme number for the DVD recorder.
- Press **SYSTEM-MENU** on the remote control. The menu bar appears.
- Select the **TV** icon using **◀** or **▶** and confirm with **▶**.
- Select the appropriate feature using **▼** or **▲** and confirm with **▶**.
- Select the corresponding line using **▼** or **▲** and confirm with **▶**.
- Select the appropriate feature using **▼** or **▲** or the setting using **◀** or **▶**.
- Confirm the setting with **OK**.
- Quit the menu item using **◀**.

Picture settings

You can choose the following features in this menu:



'TV shape'

The picture signal from your DVD Recorder can be set to match your TV screen:

- '4:3 letterbox'**: for a wide-screen picture with black bars at the top and bottom
- '4:3 pariscan'**: for a full-height picture with the sides trimmed
- '16:9'**: for a wide-screen TV set (screen edge ratio 16:9)

'Black level shift'

Adapte the colour dynamics for NTSC playback

'Video shift'

Use this feature to adjust the position of the picture on your TV left or right using **◀**, **▶** to suit your TV set.

'SCART video'

By default the recorder is set to **'RGB'**. Select **'S-Video'** if you want to connect an S-VHS recorder.

Sound settings

Depending on which audio outputs are used, you can select the settings in this menu. If you only use the analogue audio output (**OUT L AUDIO R**), select the settings **'Off'** in the **'Digital output'** menu.

'Digital output'

For devices connected to the **DIGITAL AUDIO OUT** socket, you can select from the following settings:

'AI': Dolby Digital and DTS signals are fed unaltered to the digital output. MPEG-2 multi-channel signals are converted to PCM (Pulse Code Modulation).
For receivers/amplifiers with digital multi-channel sound decoders.

'PCM only': Dolby Digital and MPEG-2 multi-channel signals are converted to PCM (Pulse Code Modulation).
For receivers/amplifiers without digital multi-channel sound decoders.

'Off': Digital output switched off.
For devices with analogue audio input.

'Analogue output'

For devices connected to the analogue audio output (**OUT L AUDIO R**), you can select from the following settings:

'Stereo': For devices without DolbySurround or TruSurround. Use this setting if the DVD recorder is only connected to a stereo TV set.

'Surround': Dolby Digital and MPEG-2 multi-channel are mixed down to a DOLBY surround-compatible two-channel output signal. For recorders with Dolby Surround Pro Logic decoder.

'3D sound': The six channels of the digital surround sound (Dolby Digital, MPEG-2) are mixed down to a two-speaker output signal. All original audio information is retained. The result is an impression of being surrounded by several loudspeakers.
For TruSurround compatible devices.


'Night mode'

Night mode optimises the sound for playback at low volume. You are therefore less likely to disturb your neighbours. This only works for Dolby Digital audio on DVD video discs.

Low power standby

To save power, you can switch off the clock display on the DVD recorder. Programmed (TIMER) recordings will still take place.

'On': If the DVD-Recorder is switched off (button **STANDBY** ) the clock display is also switched off.

'Off': If the DVD-Recorder is switched off (button **STANDBY** ) the clock display is visible.

'PBC'

This line appears only if a VCD is loaded.
This function lets you activate or deactivate the PBC menu (Playback Control) for video CDs.
See 'Playing a (Super) Video CD'.

Remote Control settings

In this menu you can set the remote control type to which your DVD recorder should respond to.

'DVD player': The DVD recorder responds to a DVD player remote control.
The DVD recorder also responds to the remote control of a DVD player (remote control code RC-6). Choose this setting if your Philips TV remote supports DVD functions.

'DVD recorder': The DVD recorder only responds to the supplied remote control.

Language settings

You can choose the following settings in this menu:

ENGLISH

Language

English

Audio Language

English

Subtitle

English

Menu

English

Country

Other

Audio Language

English

Subtitle

English

Menu

English

Country

Other

Additional settings

You can select the following functions in this menu:

Access control

On

Status box

On

Auto resume

On

Low power standby

On

Access control

On

Status box

On


Auto resume

On

Low power standby

On

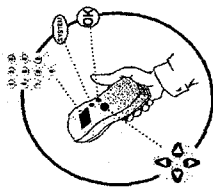
Auto resume

If playback of a pre-recorded DVD video disc or video CD is interrupted (button **STOP** ) or **OPEN/CLOSE** when the disc is reloaded (disc is started) playback starts at the precise location where it stopped. This applies not only to the current disc but to the last 20 discs played.

This feature can be switched off if not required.



Access control (Child Lock)



Child lock (DVD and VCD)

This feature enables discs to be locked for children.

When Child Lock is on, a 4-digit code (PIN) needs to be entered before a disc can be played. You can also decide whether the inserted disc should always be played or should be played only once, despite the child lock.

*Play always:

This disc is stored in a memory with space for 50 child-safe discs. If more than 50 discs are stored, the list disc in the list is removed and the new disc is added. The screen shows 'Child safe' at the start of playback.

*Play once:

This disc is only authorised for single playback. If the recorder is switched off, the PIN code must be re-entered.

Activating/deactivating child lock

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBYON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **TL** icon using **◀** or **▶**.
- 5 Select **'Features'** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm **'Access control'** using **▶**.
- 7 Enter a 4-digit code of your choice. Enter the same code again as confirmation.
- 8 Select **'Child lock'** using **▲** or **▼** and confirm with **▶**.
- 9 Select the **OK** icon using **▼** or **▲**.
- 10 Confirm with **OK**.
- 11 Quit the feature using **◀** and **SYSTEM-MENU**.

Unauthorised discs can only be played by entering the four-digit PIN code. To deactivate the child lock, select the **TL** icon in 4.

Authorising a disc

- 1 Insert a disc. The access control box will appear after a short delay.
- 2 Using **▲** or **▼** select **'Play once'** or **'Play always'**.
- 3 Enter your PIN code using the number buttons 0..9.

Double-sided DVDs may have a different ID for each side. For these discs, each side must be authorised. Multi-volume video CDs may have a different ID for each volume. For these CDs, each volume must be authorised.

Locking unlocked discs

To lock a disc that was formerly authorised follow the instructions below

- 1 Insert a disc. Playback starts automatically. If the playback does not start automatically, press **PLAY/PAUSE ▶ II**.
- 2 Press the **STOP ■** button while the **TL** icon is visible. The icon changes to **TL**. The disc is now locked.

Parental level control (DVD video only)

Films on pre-recorded DVD discs may contain scenes not suitable for children. Therefore, some discs may contain 'Parental Control' rating information that applies to the entire disc or to certain scenes on the disc.

If the disc is rated, scenes are rated from 1 to 8. If such a scene is detected during playback, it compares the scene with the filter value set on the DVD recorder. If the filter value is higher than the rating, an alternative scene is played back where possible.

Activating/deactivating parental level control

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBYON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **TL** icon using **◀** or **▶**.
- 5 Select **'Features'** using **▼** or **▲** and confirm with **▶**.

Changing the PIN code

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **TA** icon using **◀** or **▶**.
- 5 Select **'Features'** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm **'Access control'** using **▶**.
- 7 Enter your four-digit PIN code.
- 8 Select **'Change code'** using **▲** or **▼** and confirm with **▶**.
- 9 Enter the new code using the number buttons **0-9**. Enter the same code again as confirmation.
- 10 Quit using **◀** and **SYSTEM-MENU**.

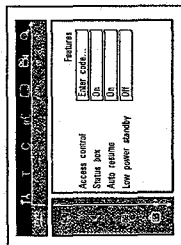


Tip

I have forgotten my code
Press **STOP** four times, then press **OK**. Access control is now switched off. You can now enter a new code as described above.

Confirm 'Access control' using ▶

- 6 Enter a 4-digit code of your choice. If the code is new, you may have to enter the code a second time as confirmation.
- 7 Select the **'Parental level'** using **▲** or **▼** and confirm with **▶**. A bar appears to select the parental level.
- 8 Select the appropriate rating using **▼**, **▲** or the number buttons **0-9**.



ENGLISH



Tip

What do the ratings mean?
Rating 0 (displayed as "-") parental control not active.
Rating 1 (suitable for children)
Rating 8 (only suitable for adults)
What happens if a DVD scene contains a higher level than the rating set?
If the recorder does not find a suitable alternative, playback will stop and you must enter the four-digit code.

- 10 Confirm with **OK**. Quit using **◀** and **SYSTEM-MENU**.


Changing the country

The set filter values depend on the respective country. It is therefore necessary to enter the country to which these filter values apply.

- 1 Switch on the TV set. If required, select the programme number for the DVD recorder.
- 2 Switch on the DVD recorder using **STANDBY/ON**.
- 3 Press **SYSTEM-MENU**. The menu bar appears.
- 4 Select the **TA** icon using **◀** or **▶**.
- 5 Select line **'Features'** using **▼** or **▲** and confirm with **▶**.
- 6 Confirm the line **'Access control'** using **▶**.
- 7 Enter your four-digit code.
- 8 Select **'Change country'** using **▼** or **▲** and confirm with **▶**.
- 9 Select the corresponding country using **▲** or **▼** and confirm with **OK**.
- 10 To end, press **◀** and then **SYSTEM-MENU**.

If you have any problems using this DVD recorder, the reason may be one of the following. You can also call the customer service centre in your country.
The telephone numbers can be found on the back of this instruction manual.
Have the model number (MODEL NO) and the production number (PROD.NO) of your recorder ready.
The serial number (PROD. NO.) is printed on the type plate at the back.

ENGLISH

PROBLEM	SOLUTION
Your recorder does not respond to any button being pressed and the display shows 	<p>✓Recorder in Initial Installation mode: Switch on the TV, switch over to the DVD recorder socket. Now the menu for language selection should appear. Please read paragraph 'Initial Installation' in the chapter 'Installing your DVD Recorder'.</p> <p>✓'Dealer-Mode' is switched on: All buttons on the front of the set are locked. Switch off the function: <ol style="list-style-type: none"> 1 Pull out the mains plug from the wall outlet. 2 Press and hold down ■STOP and ■OPEN/CLOSE and put back the mains plug into the wall outlet. 3 As soon as the time or '---' appears in the display (ca. 6 - 10 seconds), release ■STOP and ■OPEN/CLOSE. </p>
The device does not react when you press a button, although the remote control works:	<ol style="list-style-type: none"> 1 Pull out the mains plug from the wall outlet. 2 Press and hold down ■STOP and ■OPEN/CLOSE and put back the mains plug into the wall outlet. 3 As soon as the time or '---' appears in the display (ca. 6 - 10 seconds), release ■STOP and ■OPEN/CLOSE.
Your DVD recorder does not respond to any button being pressed:	<p>✓There is no power supply: check the power supply.</p> <p>✓A programmed recording (TIMER) is currently being made. If desired, cancel the programmed recording (TIMER) with STANDBY.</p> <p>✓There is a technical problem: disconnect from the mains power supply for 30 seconds, then connect again.</p> <p>If this doesn't help, you can reset your DVD recorder to the default factory settings.</p> <p>✓Important: All the information stored (TV channels, time and date, TIMER) will be lost.</p> <ol style="list-style-type: none"> 1 Disconnect from the mains power supply. 2 Press and hold down the STANDBY/ON button on the device and reconnect to the mains power supply. 3 Release the STANDBY/ON button when 'TV ON' appears on the display. All the information stored (TV channels, time and date, TIMER) will be lost. <p>Please read paragraph 'Initial Installation' in the chapter 'Installing your DVD Recorder'.</p> <p>✓Remote control not pointed toward the DVD recorder: Point the remote control at the machine.</p> <p>✓There is a technical problem: Take out the batteries, wait for 10 seconds and put them in again.</p> <p>✓Batteries are flat: Change the batteries.</p>
Resetting the machine to the default factory settings	<p>✓Important: All the information stored (TV channels, time and date, TIMER) will be lost.</p> <ol style="list-style-type: none"> 1 Disconnect from the mains power supply. 2 Press and hold down the STANDBY/ON button on the device and reconnect to the mains power supply. 3 Release the STANDBY/ON button when 'TV ON' appears on the display. All the information stored (TV channels, time and date, TIMER) will be lost. <p>Please read paragraph 'Initial Installation' in the chapter 'Installing your DVD Recorder'.</p>
Remote control does not work:	<p>✓Remote control not pointed toward the DVD recorder: Point the remote control at the machine.</p> <p>✓There is a technical problem: Take out the batteries, wait for 10 seconds and put them in again.</p> <p>✓Batteries are flat: Change the batteries.</p>

PROBLEM	SOLUTION
No playback on DVD recorder:	<p>✓There is no recording on the disc: Change disc.</p> <p>✓You inserted the wrong disc type: Your recorder can play back the following disc types: DVD Video, (Super)Video CD, DVD-R(W), Audio CD, MP3 CDs.</p> <p>✓You inserted the disc the wrong way: Insert the disc with the label facing upwards.</p> <p>✓Disc is dirty: Clean the disc.</p> <p>✓Wrong region code: The region code of the DVD and the DVD recorder must match.</p> <p>✓Parental control is on: Read chapter 'Access control (child lock)'.</p> <p>✓You have selected the wrong programme number for the DVD recorder on the TV: on the TV, select the correct programme number for the DVD recorder.</p> <p>✓The cable connecting the TV set and the DVD recorder has come loose: check the cable.</p>
I cannot playback (Super) Video CDs	<p>✓It is possible that this (Super) Video CD contains a menu and the 'PBC' is switched off. You can see this in status field 'PBC OFF'. To activate this function, proceed as follows: <ol style="list-style-type: none"> 1 Press SYSTEM-MENU while the (Super) Video-CD is inserted. 2 Select TV using ◀ or ▶. 3 Select line 'Features' using ▼ or ▲ and confirm with ▶. 4 Select 'On' in line 'PBC' using ▼ or ▲. 5 Confirm with OK and end with SYSTEM-MENU. </p>
Poor playback on DVD recorder: (distorted picture/distorted sound)	<p>✓Your TV set is not properly adjusted.</p> <p>✓Disc is dirty: Clean the disc.</p> <p>✓Sometimes the picture may be temporarily distorted. This is not a defect of your DVD recorder.</p>
No recording possible:	<p>✓The TV channel you want to record is not stored or you selected the wrong programme number. Check TV channel stored.</p> <p>✓Disc write-protected (recording protected): Remove write-protection or change the disc. For more information, please see 'Preventing accidental erasing of disc' in chapter 'Manual Recording'.</p> <p>✓An already finalised DVD-R has been inserted: Change disc.</p>
Programmed recording does not work:	<p>✓You have programmed the wrong time or date: Check time/date.</p> <p>✓You have not set the TIMER properly: Check the programmed recordings (TIMER block).</p> <p>✓Locked disc inserted: Remove disc lock.</p> <p>✓An already finalised DVD-R has been inserted: Change disc.</p> <p>✓VPS/PBC switched on but 'VPS/PBCtime' wrong: Enter 'VPS/PBCtime' exactly to the minute. Check the aerial.</p>
The wrong TV channel was decoded (entered) after you programmed a recording using ShowView.	<ol style="list-style-type: none"> 1 Enter the ShowView programming number of the TV channel you want. 2 Confirm with OK. 3 Check the programme number/channel name in the 'Prog.' input field. 4 If this does not correspond to the TV channel you want, select the input field and change the programme number/channel name. 5 Confirm with OK.
There is picture or sound interference on TV reception:	<p>✓Switch to recording mode REC with REC MODE during playback from the internal TV tuner (MONITOR button). This will help achieve the best possible picture quality.</p> <p>Before recording, select the recording mode as described in chapter 'Manual Recording' section. Selecting the recording mode (quality).</p> <p>✓Have your aerial checked.</p> <p>✓You will find information on how to change the TV system in 'Manual TV channel search' in 'Installing your DVD recorder'.</p>

PROBLEM	SOLUTION
Distorted sound coming from a connected hi-fi amplifier	<p>✓The DVD recorder is connected to the "Photo-input" of your amplifier. This socket is provided only for record players without a preamplifier. Select a different audio input.</p>
The picture is distorted or black-and-white during playback	<p>✓The TV system of the disc does not match that of your TV set (PAL/NTSC).</p> <p>✓The recording can be made in colour only when the TV channels or the connected additional device send a colour signal. Black-and-white signals containing no color information (colour subcarriers) cannot be recorded.</p>
No sound signal at the digital output	<p>✓Check whether the sound settings match the selected inputs and connected additional devices.</p> <p>✓Check whether you have inserted an MP3 CD in accordance with SDMI (Secure Digital Music Initiative); the digital audio output is turned off during MP3 playback. This is not a defect of your DVD recorder.</p>
A DVD+RW disc cannot be played on certain DVD players	<p>✓If a recording is too short, it is possible that a DVD player cannot detect it. Please observe the following "Minimum recording times": Recording mode "HQ": 5 minutes, "SP+": 15 minutes, "EP+": 20 minutes, "EP-": 10 minutes</p> <p>✓Some DVD players cannot play back DVD+RW recordings. You can solve this problem by using a special function. You can solve this problem by using a special function:</p> <ol style="list-style-type: none"> 1 Open the disc tray with OPEN/CLOSE. Insert the disc but do not close the tray. 2 Hold down the number button 2 on the remote control until the tray closes. The disc is modified. 3 If this fails to produce the desired result, repeat the procedure using the number button 3 on the remote control. 4 You can restore the disc to its original condition by pressing 1. <p>Warning! There is a risk that you can no longer play the disc on other DVD players after this procedure. Therefore, apply this function with particular care.</p> <p>✓If it is impossible to play back a disc, you can try and repair it for new recordings using the following function. This will only prepare the disc for erasing; it will not be erased, however, until the recording has been completed.</p> <ol style="list-style-type: none"> 1 Clean the disc. 2 Open the disc tray with OPEN/CLOSE. Insert the disc but do not close the tray. 3 Hold down CLEAR on the remote control until the tray closes. The disc is prepared for erasing. 4 Start recording with an empty disc.
Other disc errors	

4. Mechanical Instructions

4.1 Service Positions

4.1.1 Front

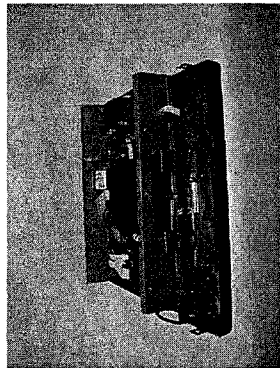


Figure 4-1

4.1.2 DVIO board

To put the DVIO board in a service position, an extender board must be used. This extender board can be ordered with codenumber 3104 128 07770.

DVIO Extender

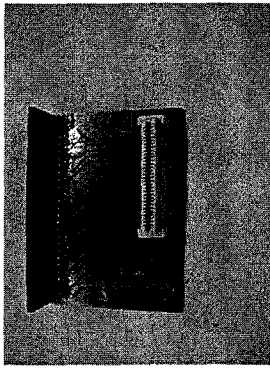


Figure 4-2

DVIO 1

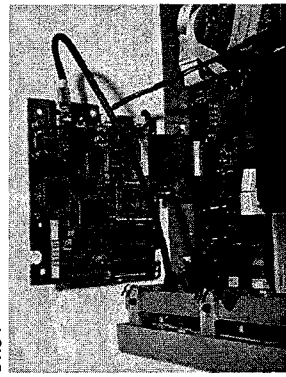


Figure 4-3

DVIO 2

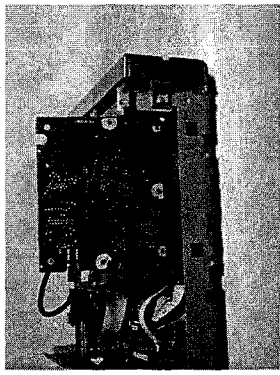


Figure 4-4

4.1.3 Digital board

After demounting of DVIO board, the top side of the digital board is in reach. To reach the bottom side of the digital board, the DVDR module must be demounted together with the digital board. Connected to each other, the assembly can be set in a service position. In this position, the bottom side of the digital board and the servo board are in reach to be serviced.

Digital 1

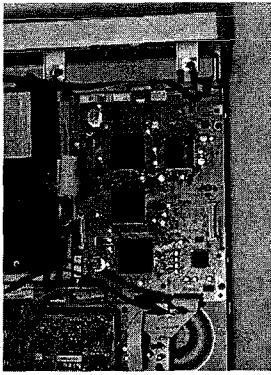


Figure 4-5

Digital 2

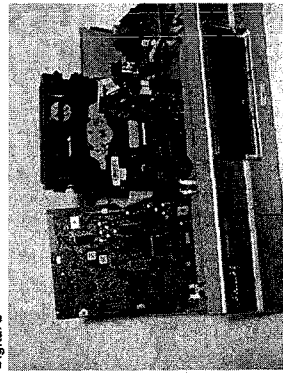


Figure 4-6

Europe

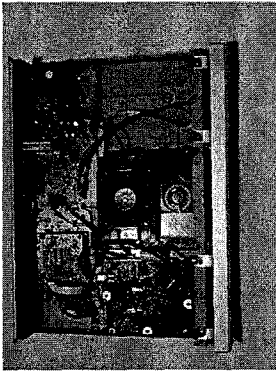


Figure 4-9

NAFTA

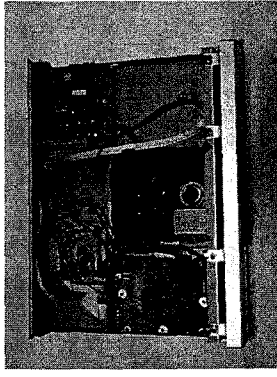


Figure 4-10

4.1.4 Analog board

To put the analog board in service position, demount the assembly of analog board and backplate as follows:

1. Remove the screw from the backplate to the mains inlet of the power supply
 2. Remove the screw safety holder
 3. Remove the 3 screws of the analog board to the frame
 4. Release the snap of the spacer of the analog board to the frame.
- Turn the assembly of the back plate and the analog board against the loader.

Analog Europe

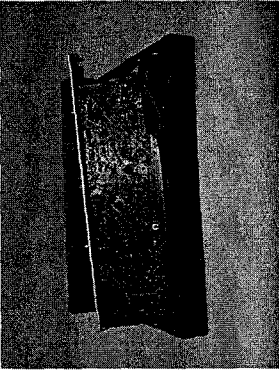


Figure 4-7

Analog NAFTA

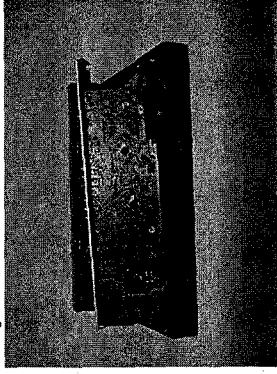


Figure 4-8

4.1.5 Cable Routing

Take care of the correct cable routing. See pictures below.

4.2 Exploded View of the Set

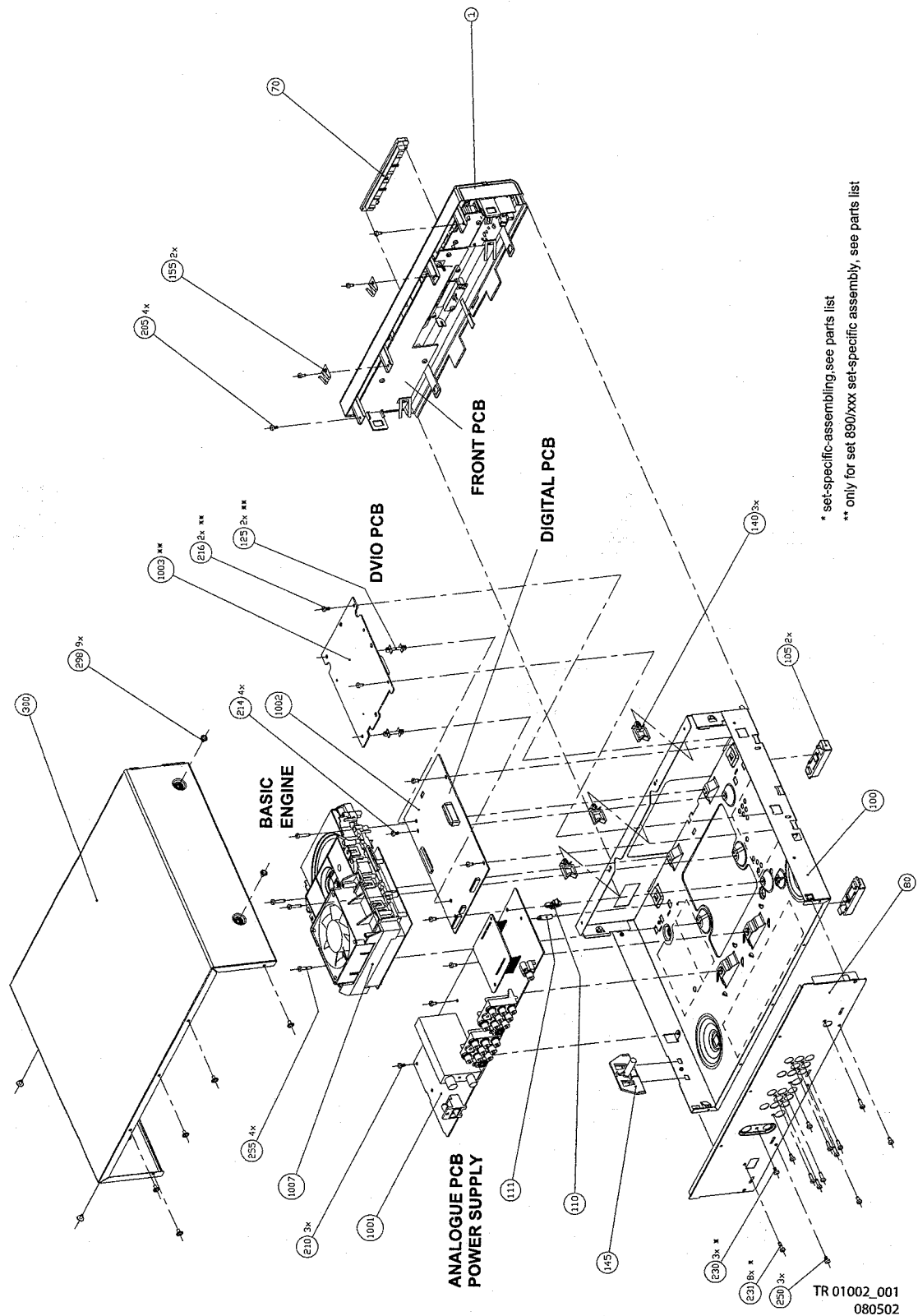
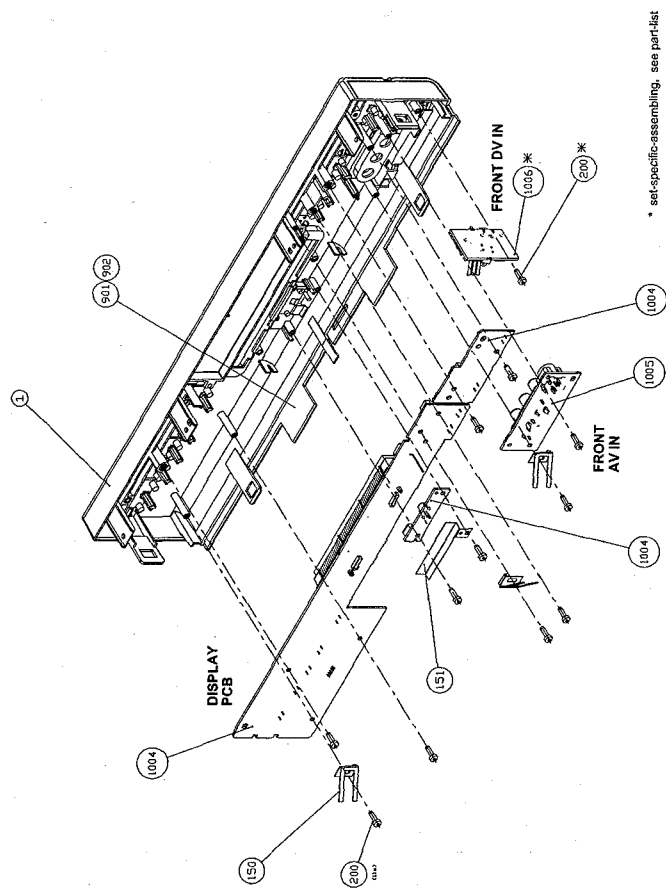


Figure 4-11

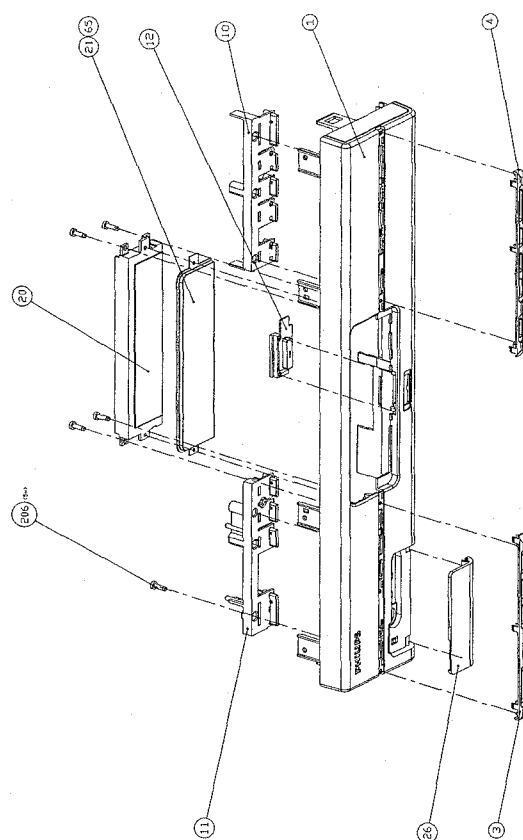
4.3 Exploded View of the complete Front Panel



TR 01003_001
080502

Figure 4-12

4.4 Exploded View of the Front without PWBs



TR 01004_001
080502

Figure 4-13

4.5 Dismantling Instructions

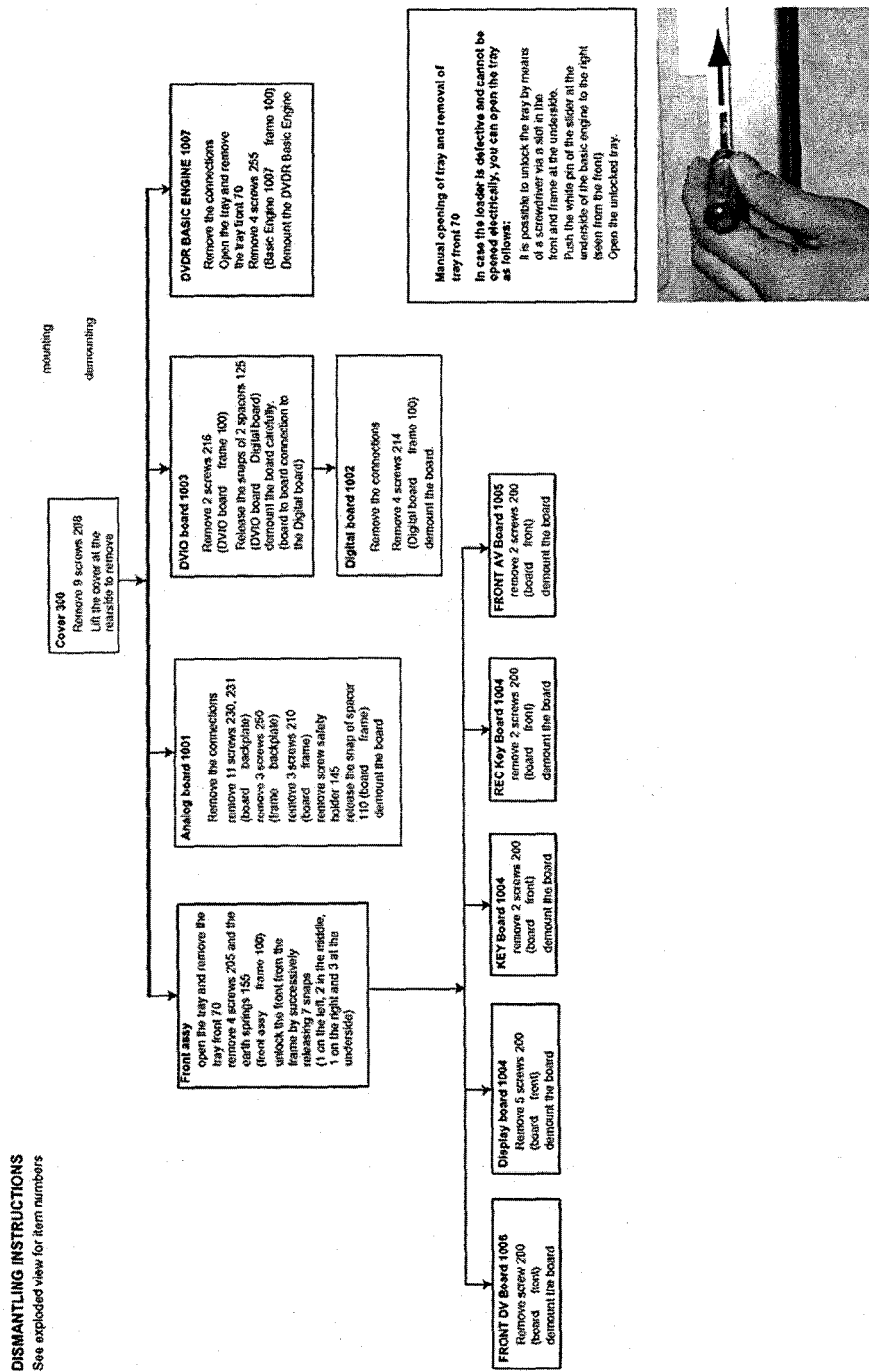
TR 01005_001
090502

Figure 4-14

5. Diagnostic Software

Due to the complexity of the DVD recorder, the time to find a defect in the recorder can become long. To reduce this time, the recorder has been equipped with Diagnostic and Service software (DS). The DS offers functionality to diagnose the DVDR hardware and tests the following:

- Interconnections between components
 - Accessibility of components
 - Functionality of the audio and video paths
- This functionality can be accessed via several interfaces:
1. End User/Dealer script interface
 2. Player script interface
 3. Menu and command interface

5.1 End User/Dealer Script Interface

5.1.1 Description

The End user/Dealer script interface gives a diagnosis on a stand alone DVD recorder; no other equipment is needed. During this mode, a number of hardware tests (nuclei) are automatically executed to check if the recorder is faulty. The diagnosis is simply a "fail" or "pass" message. If the message "FAIL" appears on the display, there is apparently a failure in the recorder. If the message "PASS" appears, the nuclei in this mode have been executed successfully. There can be still a failure in the recorder because the nuclei in this mode don't cover the complete functionality of the recorder.

5.1.2 Contents

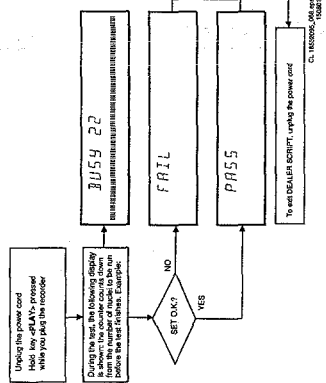


Figure 5-1

The End user/Dealer script executes all diagnostic nuclei that do not need any user interaction and are meaningful on a standalone DVD recorder. The nuclei called in the End user/Dealer script are the following:

Counter	Nucleus Name	Description
22	HostIdSramWr	checks all memory locations of the 4MB SDRAM
21	HostIdSramWr	checks all the SDRAM connected to the microprocessor of the digital board
20	HostIdSramWr	checks the data line (SDA) and the clock line (SCL) of the I2C bus between the host decoder and NVRAM
19	SAAT18I2C	checks the interface between the Host I2C controller and the AVEHC SAA7118 Video Input Processor
18	VideoEncI2C	checks the interface between the host I2C controller and Empress SAA6752
17	AudioEncI2C	checks the I2C connection between the host decoder and Empress SAA6752
16	AudioEncAccess	tests the HiO8 interface lines between the host decoder and the audio encoder
15	AudioEncSramWr	checks the access of the SRAM by the audio encoder (address and data lines).
14	AudioEncSramWr	tests the SRAM connected to the audio encoder
13	AudioEncInterrupt	tests the interrupt line between the host decoder and the audio encoder
12	VsmAccess	checks whether the VSM interrupt controllers and DRAM are accessible
11	VsmInterrupt	checks both interrupt lines between the VSM and the host decoder
10	VsmSramWr	tests the entire SDRAM of the VSM
9	Clock11_289MHz	switches the A_CLK of the micro clock to 11.2896 MHz
8	Clock12_288MHz	switches the A_CLK of the micro clock to 12.288 MHz
7	BeS2Bengine	checks the S2B interface with the Basic Engine by sending an echo command
6	DisplayEcho	checks the interface between the host processor and the slave processor on the display board
5	AnalogueEcho	checks the interface between the host processor and the microprocessor on the analogue board
4	AnalogueNram	checks the NVRAM on the analogue board
3	AnalogueTuner	checks whether the tuner on the analogue board is accessible
2	LoopAudioUserDealer	This nucleus tests the components on the audio signal path. The host decoder - The analogue board - The audio encoder - The VSM On the analogue board the audio is internally looped back to the digital board
1	LoopVideoUserDealer	Nucleus for testing the components on the video signal system path: - The VIP - The video encoder - The VSM - The host decoder - The analogue board On the analogue the video signal is internally routed back to the digital board.

5.2 Player Script Interface

5.2.2 Structure of the Player Script

5.2.1 Description

The Player script will give the opportunity to perform a test that will determine which of the DVD recorder's modules are faulty, to read the error log and to perform an endurance loop test. To successfully perform the tests, the DVD recorder must be connected to a TV set.

To be able to check results of certain nuclei, the player script expects some interaction of the user (i.e. to approve a test picture or a test sound). Some nuclei (e.g. nuclei that test functionality of the DVDR module) require that a DVD-RW disc is inserted.

Only tests within the scope of the diagnostic software will be executed hence only faults within this scope can be detected.

The player script consists of a set of nuclei testing the hardware modules in the DVD recorder: the Display PWB, the Digital PWB, the Analogue In/Out PWB and the DVDR module. Nuclei run by the player test need some user interaction: in the next table this interaction is described. The player test is done in two phases:

- Interactive tests: this part of the player test depends strongly on user interaction and input to determine nucleus results and to progress through the full test. Reading the error log information can be useful to determine any errors that occurred recently during normal operation of the DVD player.
- The loop test will perform the same nuclei as the dealer test, but it will loop through the list of nuclei indefinitely.

STEP	DESCRIPTION	NUCLEUS
1	Press OPEN/CLOSE and PLAY at the same time and POWER ON the recorder to start the playerscript	2
2	The local display shows FSEGMENTS. Press PLAY to start the test. First the starburst pattern is lit, then the horizontal segments are lit, followed by the vertical segments and the last test is light all segments test. After each of the 4 tests the user has to confirm that the correct pattern was lit.	502
	Press RECORD to indicate that the correct pattern was lit (four times if the FSEGMENTS test was successful). Press STOP to skip this nucleus.	
3	The local display shows FLABELS. Press PLAY to start the test. Press PLAY to confirm that all labels are lit. Press RECORD to indicate that not all labels are lit. Press STOP to skip this nucleus.	503
4	The local display shows FLIGHT ALL. Press PLAY to start the test. Press PLAY to confirm that everything was lit. Press RECORD to indicate that not all patterns are lit. Press STOP to skip this nucleus.	520
5	The local display shows FLED. Press PLAY to start the test. Press PLAY to confirm that the led is lit. Press RECORD to indicate that the led is not lit. Press STOP to skip this nucleus.	504
6	The local display shows FFLAP OPEN. Press PLAY to start the test. Press PLAY to confirm that the flap has opened. Press RECORD to indicate that the flap did not open. Press STOP to skip this nucleus.	522
7	The local display shows FKEYBOARD. Press PLAY to start the test. Attention all keys have to be pressed to get a positive result. Press PLAY for more than one second to confirm that all the keys were pressed and shown on the local display. If not all the keys were pressed, a FAIL message will appear on the local display. Press RECORD for more than one second to indicate that not all keys were pressed and shown on the local display. Press STOP to skip this nucleus.	505
8	The local display shows FREMOTE CONTROL. Press PLAY to start the test. Press PLAY to confirm that a key on the remote control was pressed and shown on the local display. Only one key has to be pressed to get a successful result. Press RECORD to indicate that the key on the remote control was pressed but not shown on the local display. Press STOP to skip this nucleus.	506
9	The local display shows FDIMMER. Press PLAY to start the test. Press PLAY to confirm that the text on the local display was dimmed. Press RECORD to indicate that the text on the local display was not dimmed. Press STOP to skip this nucleus.	518
10	The local display shows FBEPPER. Press PLAY to start the test. Press PLAY to confirm that the beeper on the front panel sounded. Press RECORD to indicate that the beeper on the front panel did not sound. Press STOP to skip this nucleus.	514
11	The local display shows FFLAP CLOSE. Press PLAY to start the test. Press STOP to skip this nucleus.	523
12	The local display shows ROUTE VIDEO. Press PLAY to start the test. Press STOP to skip this nucleus.	712
13	The local display shows ROUTE AUDIO. Press PLAY to start the test. Press STOP to skip this nucleus.	713
14	The local display shows COLOUR-BAR ON. Press PLAY to start the test. Press STOP to skip this nucleus.	120

STEP	DESCRIPTION	NUCLEUS
15	The local display shows PINK NOISE ON . Press PLAY to start the test. Press STOP to skip this nucleus.	115
16	The local display shows PINK NOISE OFF . Press PLAY to start the test. Press STOP to skip this nucleus.	116
17	The local display shows SINE ON . Press PLAY to start the test. Press STOP to stop the sine. Press STOP to skip this nucleus.	117
18	The local display shows COLOUR-BAR OFF . Press PLAY to start the test. Press STOP to skip this nucleus.	121
19	The local display shows BERESET . Press PLAY to start the test. Press STOP to skip this nucleus.	603
20	The local display shows BETRAY OPEN . Press PLAY to start the test. Press STOP to skip this nucleus.	616
21	The local display shows BETRAY CLOSE . Press PLAY to start the test. Press STOP to skip this nucleus.	615
22	The local display shows BEWRITE READ . Press PLAY to start the test. Press STOP to skip this nucleus.	617
23	The local display shows BETRAY OPEN . Press PLAY to start the test. Press STOP to skip this nucleus.	616
24	The local display shows BETRAY CLOSE . Press PLAY to start the test. Press STOP to skip this nucleus.	615
25	The local display shows READ ERRORLOG . Press PLAY to start the test. Press STOP to skip this nucleus. If the player test succeeded, the user/dealer script will start in an endless loop. If the player test failed, the local display will display FAIL and the error code	633

Remark

In case of failure, the display shows " FAIL XXXXXX ". The description of the shown error code can be retrieved in the survey of Nuclei Error Codes (paragraph 5.4). Once an error occurs, it is not possible to continue the player script. Unplug the set and restart the player script. By pressing the STOP key, it is possible to jump over the failure and to continue the player script.

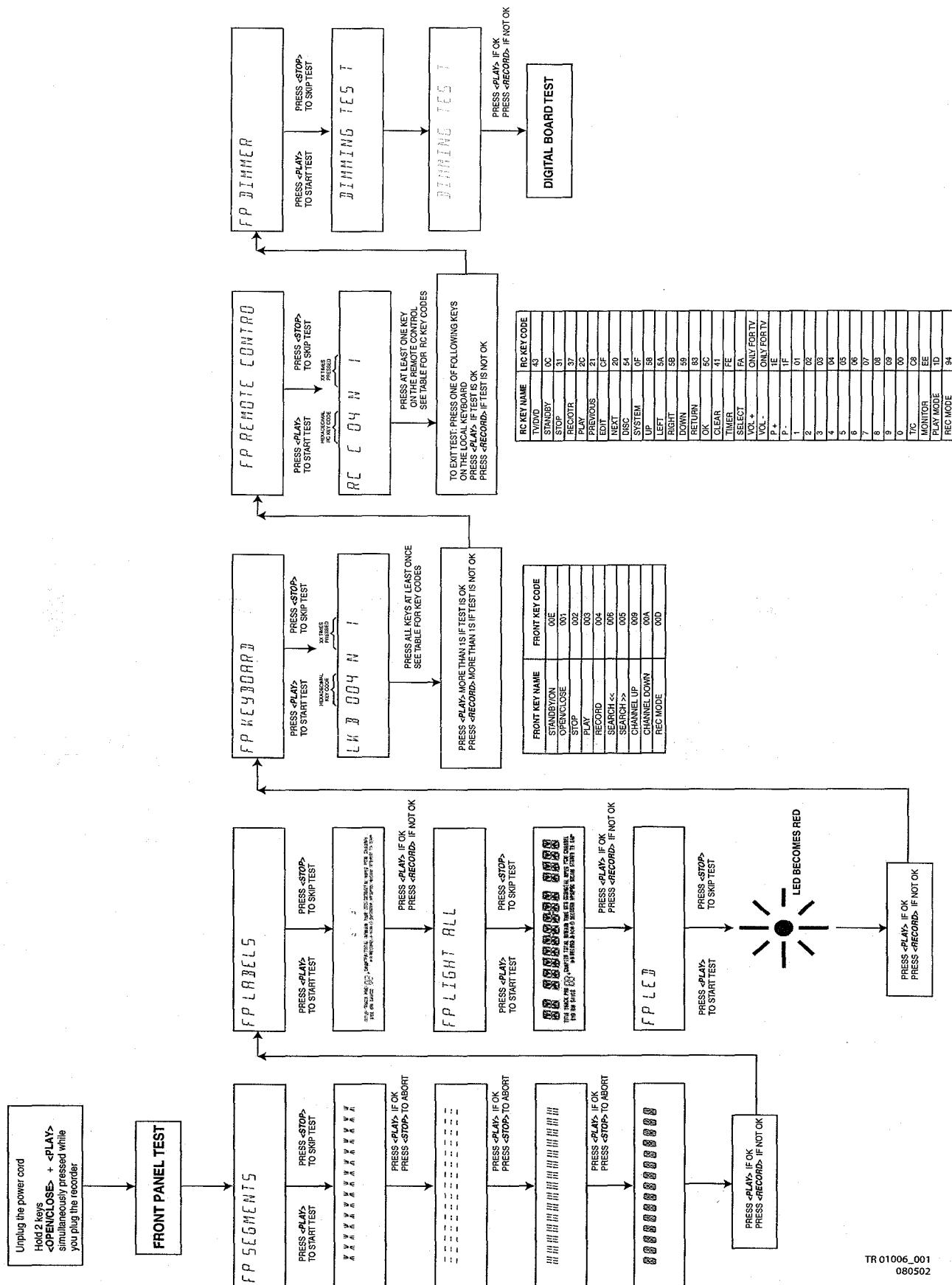
TR 01006_001
080502

Figure 5-2

Command Overview

We provide an overview of the nuclei and their numbers. This overview is preliminary and subject to modifications.

Host Decoder [01]

[xx yy] Number	Nuclei
100	Checksum Flash
101	Flash Write Access 1
102	Flash Write Access 2
103	Flash Write Read
104	SdRam Write Read
105	SdRam Write Read Fast
106	Dram Write Read
107	Dram Write Read Fast
108	Hardware Version
109	Mute On
110	Mute Off
115	Pink Noise On
116	Pink Noise Off
117	Sine On
118	Sine Burst 1KHz
119	Sine Burst 12KHz
120	Colour-bar On
121	Note: Use nucleus 712 with parameter 07 to route the signals to the analogue board output
122	Colour-bar Off
123	NvramWIR
130	Boot Version
131	Application Version
132	Diagnostics Version
133	Download Version
134	Write / read I2C message to / from digital board
135	Video Test Signal
OnNote: Use nucleus 712 with parameter 07 to route the signals to the analogue board output.	
Input: 135 [a] [b]	
a. Number of test image,	
0. Horizontal colour-bar	
1. White	
2. Yellow	
3. Light blue	
4. Green	
5. Magenta	
6. Red	
7. Blue	
8. Black	
9. Colour triangle (execution time is 12 seconds)	
10. Test image for progressive scan (execution time is 6 seconds)	
b. Video standard,	
0. PAL BDGHI	
1. NTSC	
136	Video Test Signal Off
137	Macrovision Off

Audio Video Decoder [02]

[xx yy] Number	Nuclei
200	Video Encoder I2C
202	SA7118 I2C
203	Audio Encoder SRAM Access
204	Audio Encoder Access
205	Audio Encoder SRAM Write Read
206	Audio Encoder Interrupts

[xx yy] Number	Nuclei
207	Audio Encoder I2C
208	SA7118 select input
209	Empress Version

VSM [03]

[xx yy] Number	Nuclei
300	Register Access
301	SDRAM Access
302	SDRAM Write Read
303	Interrupt lines
304	VSM Interconnection
305	UART

NVRAM [04]

[xx yy] Number	Nuclei
400	Reset
401	Read
402	Modify
403	UniqueN Read
404	Read Error Log
407	Reset Error Log
409	Line2 Region-Code Reset
410	UniqueN Store

Front Panel [05]

[xx yy] Number	Nuclei
500	Echo
501	Version
502	Segment
503	Label
504	Led
505	Keyboard
506	Remote-Control
507	Segment Starburst
508	Segment Vertical
509	Segment Horizontal
514	Beeper
515	Discbar
516	Discbar Dots
517	Vu / Grid
518	Dimmer
519	Blinking
520	Light All Segments
522	Flap Open
523	Flap Close

Basic Engine [06]

[xx yy] Number	Nuclei
600	S2B Pass
601	S2B Echo
602	Version
603	Reset
604	Focus On
605	Focus Off
606	Disc Motor On
607	Disc Motor Off
608	Radial On

[xx yy] Number	Nuclei
609	Radial Off
615	Tray In
616	Tray Out
617	Write Read
618	Write Read Endless Loop
619	Selftest
620	BE Test
621	Laser Test
622	Spindle (Disc) Motor Test
623	Focus Test
624	Sledge Motor Test
625	Sledge Motor Slow
626	Tilt
627	EEPROM Read
628	EEPROM Write
629	Optimise Jitter
630	Radial ATLS Calibration
631	Get Statistics Information
632	Reset Statistics Information
633	BE Read Error Log
634	BE Reset Error Log
638	Get Self Test Result
639	Radial Initialisation
640	Get OPU info

Analog Board [07]

[xx yy] Number	Nuclei
700	Echo
703	Boot Version
704	Hardware Version
705	Clock Adjust
706	Tuner
707	Frequency Download
708	Data Slicer
709	Sound Processor
710	AV Selector
711	Nvram
712	Route Video
713	Route Audio
715	Set Slash Version
716	Application Version
717	Diagnostics Version
718	Download Version
720	Bargraph Level Adjustment
721	Clock correction
722	Clock reference
723	Re-virginise Recorder
724	Flash Checksum
725	Tuner frequency selection
Europe: To make video and audio signals from the tuner available on SCard2, send command "712 08".	
For Ntata/Apac: To make the black/white video available on Y/C Rear Out connector, send command "712 08"	
Input: 725 [frequency in MHz*16] [system]	
System: NTSC=16, PAL BG=16, PAL L=32, PAL DK=48, SEC L=64, SEC LS=80, SEC BG=96, SEC DK=112	
727	Set virgin bit
728	Clear Virgin Bit
729	Write / read I2C message to / from analogue board

[xx yy] Number	Nuclei
730	Store external presets
731	Get slash version
732	AFC Reference Voltage Tuner

DVIO [08]

[xx yy] Number	Nuclei
800	Check DVIO board presence
801	Reset DVIO
802	DVIO Access
803	Get DVIO error codes
804	Get DVIO module Ids
805	Execute DVIO module SelfTestInput: 805 [a]
(b)Parameters: a=1/0...full Ram test, b=1/0...cable connected	
806	Set DVIO led on.
807	Set DVIO led off.

Loop Nuclei [09]

[xx yy] Number	Nuclei
900	Digital Audio Loop(no function in Gen. 1.5 and Lead)
901	User / Dealer Audio Loop
902	Digital Video Loop
903	Digital Video VBI Loop
904	System Video Loop
905	System Video VBI Loop
906	User / Dealer Video Loop
907	User / Dealer Video VBI Loop
908	System Audio Loop SCART
909	System Audio Loop CINCH
910	Digital DVIO Video Loop
911	System Video Vip

Miscellaneous [14]

[xx yy] Number	Nuclei
1400	Clock 11.289 MHz
1401	Clock 12.288 MHz
1412	Progressive Scan I2C
1413	Progressive Scan test image on
1414	Progressive Scan test image off
1415	Progressive Scan Route Enable
1416	Progressive Scan Route Disable

Scripts [00]

[xx yy] Number	Nuclei
1	UserDealer Script
2	Player Script

Routing Audio and Video

Route Video
Nucleus Number: 712

Description
This nucleus routes the video signals on the analogue board to the destination determined by the input parameters

The paths that are available for video routing and their description(Europe version):

Path ID	Description
00	Input signal is VIDEO(CVBS) from digital board and will be re-routed back to the digital board.
01	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.
02	No Routing.
03	Input signal is from FRONT S-VIDEO(Y/C) and will be routed to the digital board.
04	No Routing.
05	Input signal is CVBS from SCART1 and will be routed to the digital board.
06	Input signal is CVBS from SCART2 and will be routed to the digital board.
07	Input signal is CVBS from Digital Board and it will be routed to SCART1 and SCART2.
08	Input signal is VIDEO(CVBS) from ANTENNA IN and will be routed to SCART2.
09	Input signal is VIDEO(CVBS) from SCART1 and will be routed to SCART2.
10	Input signal is VIDEO(CVBS) from SCART2 and will be routed to SCART1.
11	Signal path is routed Fast Blank from Scart2 pin16 and will be routed Scart1 pin16
12	Input Signal is Y/C from Digital Board and it will be routed to SCART1.
13	No Routing.
14	No Routing.
15	Input Signal is CVBS from TUNER and it will be routed to Digital .
16	No Routing.
17	Input Signal is routed from digital board Y/C to REAR S-VIDEO(Y/C) OUT
18	Signal path is routed from digital board RGB to RGB SCART1 and from digital board CVBS to digital board CVBS.
19	No Routing.
20	Input RGB Signal is routed from Digital Board to SCART1(RGB) Input CVBS Signal from Digital Board to Digital Board and Fast Blanking Signal from Scart 2 to SCART1.
21	Input Y/C Signal from Digital Board is routed to Rear Y/C Connector and Input Y/c Signal from Front Y/C connector is routed to Digital Board.

The paths that are available for video routing and their description (Nalita region):

PATH ID	DESCRIPTION
00	Input signal is VIDEO(CVBS) from digital board and will be re-routed back to the digital board.A Cinch Cable need to be connected from Rear Cinch Out to Front Cinch In for this Test.(Direct routing on analogue board from YUV In to YUV Out is not Possible)
01	Input signal is from FRONT VIDEO(CVBS) IN and will be routed to the digital board.This routing is same as the above path id.
02	Input signal is from REAR VIDEO(CVBS) IN and will be routed to the digital board.
03	Input signal is from FRONT S-VIDEO(Y/C) IN and the signal received will be routed to the digital board.
04	Input signal is from REAR S-VIDEO(Y/C) IN and will be routed to the digital board.
05	No Routing.
06	No Routing.
07	No Routing.
08	Input signal is VIDEO(CVBS) from TUNER and will be routed to Y Pin of Rear Y/C Connector.This will give only black/White Picture .
09	Input signal is from YUV IN and will be routed to YUV OUT.This is possible only if Digital Board routes back YUV signal received back to the Analogue board(OENC)
10	No Routing.
11	No Routing.
12	No Routing.
13	No Routing.
14	No Routing
15	Input CVBS Signal from Tuner is routed to Digital Board..
16	No Routing
17	Input RGB Signal is routed from Digital Board to RGB Rear Out and Input CVBS Signal is routed from Rear Cinch In 1 to Digital Board(This second step is for routing Input CVBS Signal from Digital Board to Digital Board again - A Cinch cable need to be connected from Rear Cinch Out1 to Rear Cinch In 1)
18	Input Signal from CVBS Rear In is routed to Digital Board.This is same as path id 02.
19	Input Y/C signal from Digital Board is routed to Y/C Rear Out Connector and Input signal from Y/C Rear In Connector is routed to Y/C Digital Board.

23	The Video signal received from the Digital board will be outputted on Modulator channel 3. Please use command 120 for testing Video because Nuclei 120 will generate the Colour Bar signal on the digital Board.
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4. Please use command 120 for testing Video because Nuclei 120 will generate the Colour Bar signal on the digital Board.

Example

DD> 712 01

71200: Video routing on the Analogue Board OK.

Test OK @

Description

This nucleus routes the audio on the analogue board to the destination determined by the input parameters
The paths that are available for audio routing and their description (Europe version)

Route Audio	Nucleus Number: 713	DESCRIPTION
PATH ID		
00	No Routing.	
01	Input signal is from FRONT AUDIO IN and will be routed to the digital board.	
02	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.	
03	Input Audio Signal is routed from FRONT Cinch In to Digital Board.(This is same as path id 01)	
04	Input Signal is from Rear Cinch In1 and it will be routed to Digital Board..	
05	No routing.	
06	No routing.	
07	No routing.	
08	No Routing.	
09	No routing.	
10	No Routing.	
11	No Routing.	
12	No Routing.	
13	Input Signal is from Digital Board and it will be routed to the digital board.	
14	No routing.	
15	Input is Audio Signal from TUNER and it will be routed to Digital Board.	
16	Input signal is AUDIO from divo board and will be routed to Digital Board.	
17	No routing.	
18	No routing.	
19	No routing.	
20	Input signal is from REAR AUDIO IN 2 and will be routed to the digital board.	
21	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.	
22	Input signal is from REAR AUDIO IN 1 and will be routed to the digital board.	
23	The Audio signal received from the Digital board will be outputted on Modulator channel 3. Please use command 117 for testing audio because Nuclei 117 will generate the Audio signal on the digital Board.	
24	The Audio signal received from the Digital board will be outputted on Modulator channel 4. Please use command 117 for testing audio because Nuclei 117 will generate the Audio signal on the digital Board.	

EXAMPLE

DD> 713 00

71300: Audio routing on the Analogue Board OK.

Test OK @

5.3.4 Menu Mode Interface

Activation

Plug the recorder to the mains and the following text will appear on the screen of the terminal (program):

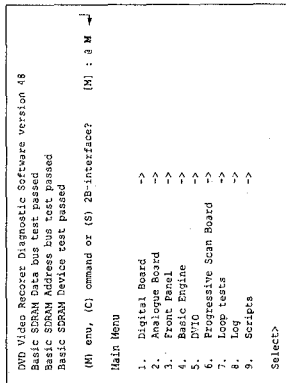


Figure 5-8

The first line indicates that the Diagnostic software has been activated and contains the version number. The next lines are the successful result of the SDRAM interconnection test and the Basic SDRAM test. The last line allows the user to choose between the three possible interface forms. If pressing M has made a choice for Menu Interface, the Main Menu will appear.

Menu Structure	
The following menu structure is given after starting up the DVD recorder in menu mode. The symbol -> indicates that the current menu choice will invoke the display of a submenu.	
Main Menu	
1. Digital Board	->
2. Analogue Board	->
3. Front Panel	->
4. Basic Engine	->
5. D/VIO	->
6. Progressive Scan Board	->
7. Loop Tests	->
8. Log	->
9. Scripts	->
Digital Board Menu	
1. Host Decoder	->
2. VSM	->
3. AVENC	->
4. NVRAM	->
Host Decoder Menu	
1. Flash Checksum	->
2. Flash1 Write Access	->
3. Flash2 Write Access	->
4. Flash Write/Read	->
5. Host SDRAM Write/Read	->
6. Host SDRAM Fast Write/Read	->
7. Host DRAM Write/Read	->
8. Host DRAM Fast Write/Read	->
9. I2C NVRAM	->
10. NVRAM Write/Read	->
11. Engine S2B Echo	->
12. Versions	->
13. Audio Mute	->
14. Colourbar	->
15. Pink Noise	->
16. Sine Generate	->
Analogue Board Versions Menu	
1. Hardware Version	->
2. Bootcode version	->
3. Application version	->
4. Diagnostics version	->
5. Download version	->
Analogue Components Menu	
1. Tuner	->
2. Data Slicer	->
3. Sound Processor	->
4. AV Selector	->
5. NVRAM	->
Analogue Board Re-virginize Menu	
1. Re-virginize Recorder	->
2. Set Virgin-bit	->
3. Clear Virgin-bit	->
4. Store external presets	->
Front Panel Menu	
1. Echo	->
2. Version	->
3. Flap Control	->
4. Segment Test	->
5. Light Labels	->
6. Led test	->
7. Keyboard test	->
8. Remote Control	->
9. Beep	->
10. Disc Bar	->
11. Disc Bar Dots	->
12. Vu Grid	->
13. Dimmer	->
14. Blink	->
15. Light All Segments	->
Flap Control Menu	
1. Open Flap	->
2. Close Flap	->
Segment Test Menu	
1. Starburst	->
2. Light Horizontal Segments	->
3. Light Vertical Segments	->
4. Light All Segments	->

Basic Engine Menu

- 1.Reset
- 2.52B Pass-through
- 3.52B Echo
- 4.Focus On
- 5.Focus Off
- 6.Version
- 7.Self Test
- 8.Get Self Test Result
- 9.Basic Engine Test
- 10.Laser Test
- 11.Focus Test
- 12.Tilt Test
- 13.Optimise Jitter
- 14.Statistics Info
- 15.Log
- 16.Spindle Motor
- 17.Radial
- 18.Sledge
- 19.Tray

->
->
->
->
->

Basic Engine Error Log

- 1.Read Error Log
- 2.Reset Error Log

Basic Engine Spindle Motor Menu

- 1.Spindle Motor On
- 2.Spindle Motor Off
- 3.Spindle Motor Test

Basic Engine Radial Menu

- 1.Radial On
- 2.Radial Off
- 3.Radial Initialisation
- 4.Radial ATLS Calibration

Basic Engine Sledge Menu

- 1.Sledge test
- 2.Sledge test slow

Basic Engine Tray Menu

- 1.Tray In
- 2.Tray Out

DVIO Menu

- 1.Check Presence
- 2.Reset
- 3.Access
- 4.Error Codes
- 5.Module Identifiers
- 6.Led

DVIO Led Menu

- 1.Led On
- 2.Led Off

Progressive Scan Board Menu

- 1.I2C Access
- 2.Test Image On
- 3.Test Image Off

Loop Tests Menu

- 1.Digital Board Loops
- 2.User/Dealer Loops
- 3.System Loops
- 4.Basic Engine Loops

Digital Board Loops Menu

- 1.Obsolete
- 2.Digital Video Loop
- 3.Digital Video Loop VBI

User/Dealer Loops Menu

- 1.User/Dealer Audio Loop
- 2.User/Dealer Video Loop
- 3.User/Dealer Video Loop VBI

System Loops Menu

- 1.System Video Loop
- 2.System Video Loop VBI
- 3.System Audio Loop SCART(EURO)
- 4.System Audio Loop CINCH (NAFTA)

Basic Engine Loops Menu

- 1.Basic Engine write read
- 2.Basic Engine write read endless loop

Log Menu

- 1.Read Error Log
- 2.Reset Error Log

Script Menu

- 1.User/Dealer Script
- 2.Player Script

5.4 Nuclei Error Codes

In the following table the error codes will be described.

Error Nr	Error String
10000	"Checksum is OK"
10001	"segment name Checksum doesn't match" or "segment name segment not found"
10100	""
10101	"FLASH 1 Write access test failed"
10200	""
10201	"FLASH 2 Write access test failed"
10300	""
10301	"FLASH write test failed"
10302	"FLASH write command failed"
10303	"FLASH write test done max. number of times"
10400	""
10401	"HostDec SDRAM Memory data bus test goes wrong."
10402	"HostDec SDRAM Memory address bus test goes wrong."
10403	"HostDec SDRAM Physical memory device test goes wrong."
10500	""
10501	"HostDec SDRAM Memory data bus test goes wrong."
10502	"HostDec SDRAM Memory address bus test goes wrong."
10503	"HostDec SDRAM Physical memory device test goes wrong."
10600	""
10601	"HostDec DRAM Memory data bus test goes wrong."
10602	"HostDec DRAM Memory address bus test goes wrong."
10603	"HostDec DRAM Physical memory device test goes wrong."
10700	""
10701	"HostDec DRAM Memory data bus test goes wrong."
10702	"HostDec DRAM Memory address bus test goes wrong."
10703	"HostDec DRAM Physical memory device test goes wrong."

Error Nr	Error String
10800	"Host Decoder version(cut) number: version number""Digital hardware version"
10801	"Can not find version in FLASH."
10900	""
10901	"Error muting audio"
11000	""
11001	"Error demuting audio"
11500	""
11501	"Init of I2C failed"
11502	"The selection of the clock source failed"
11504	"The demute of the audio failed"
11600	""
11601	"Init of I2C failed"
11602	"The mute of the audio failed"
11700	""
11701	"Init of I2C failed"
11702	"The muting of the audio failed"
11703	"The demute of the audio failed"
11704	"The selection of the clock source failed"
11707	"Setup of Front panel failed"
11708	"Sine on Front panel keyboard failed"
11800	""
11801	"Init of I2C failed"
11802	"The muting of the audio failed"
11803	"The demute of the audio failed"
11804	"The selection of the clock source failed"
11805	"Error cannot start VSM audio in port"
11900	""
11901	"Init of I2C failed"
11902	"The muting of the audio failed"
11903	"The demute of the audio failed"
11904	"The selection of the clock source failed"
11905	"Error cannot start VSM audio in port"
12000	""
12001	"Invalid input"
12100	""
12200	""
12201	"I2C bus busy before start"
12202	"NVRAM access time-out"
12203	"No NVRAM acknowledge"
12204	"NVRAM time-out"
12205	"NVRAM Write/Read back failed"
12300	""
12301	"I2C bus busy before start"
12302	"NVRAM read access time-out"
12303	"No NVRAM read acknowledge"
12304	"NVRAM read failed"
13000	"Bootcode application version : bootversion"
13001	"Can not find version in FLASH."
13100	"Recorder application version : recordversion"
13101	"Can not find version in FLASH."
13200	"Diagnostics application version : diagversion"
13201	"Can not find version in FLASH."
13300	"Download application version : downloadversion"
13301	"Can not find version in FLASH."
13700	""
13701	"Turning off MacroVision failed"
20000	""
20001	"I2C bus busy before start"
20002	"Video Encoder access time-out"
20003	"No acknowledge from Video Encoder"

Error Nr	Error String
20004	"No data send/received to or from Video Encoder"
20005	"SAA7118 VIP can not be initialised"
20200	""
20201	"I2C bus busy before start"
20202	"SAA7118 VIP access time-out"
20203	"No acknowledge from SAA7118 VIP"
20204	"No data received from SAA7118 VIP"
20300	""
20301	"Error audio encoder SRAM access cannot initialise I2C"
20302	"Error audio encoder SRAM access cannot reset DSP through I2C"
20303	"Error audio encoder SRAM access cannot download boot"
20304	"Error audio encoder cannot download test code"
20305	"Error audio encoder cannot obtain result of test"
20306	"Error audio encoder SRAM access stuck-at-zero data line"
20307	"Error audio encoder SRAM access stuck-at-one data line"
20308	"Error audio encoder SRAM access stuck-at-one address line"
20309	"Error audio encoder SRAM access address line address line x is connected to data line data line y"
20310	"Error audio encoder SRAM access address lines address line x and address line y are connected"
20311	"Error audio encoder SRAM access data lines data line x and data line y are connected"
20312	"Error audio encoder SRAM access illegal data received"
20400	""
20401	"Error audio encoder access cannot initialise I2C"
20402	"Error audio encoder access cannot reset DSP through I2C"
20403	"Error audio encoder accessing ICR register"
20404	"Error audio encoder access stuck-at-zero of data line"
20405	"Error audio encoder access stuck-at-one of data line"
20406	"Audio encoder access data lines data line x and data line y are interconnected"
20500	""
20501	"Error audio encoder SRAM WRR cannot initialise I2C"
20502	"Error audio encoder SRAM WRR cannot reset DSP through I2C"
20503	"Error audio encoder WRR cannot download boot"
20504	"Error audio encoder cannot download test code"
20505	"Error audio encoder SRAM WRR cannot obtain result of test"
20506	"Error audio encoder WRR SRAM stuck-at-zero data bit"
20507	"Error audio encoder WRR SRAM stuck-at-one data bit"
20508	"Error audio encoder WRR SRAM data lines data line x and data line y are connected"
20509	"Error audio encoder WRR SRAM illegal data received"
20600	""
20601	"Error audio encoder interrupt cannot initialise I2C"
20602	"Error audio encoder interrupt cannot reset DSP through I2C"
20603	"Error audio encoder cannot download test code"
20604	"Error occurred accessing VSM"
20605	"Audio encoder interrupt not received"

Error Nr	Error String	Error Nr	Error String
20606	"Error occurred while activating the encoder"	30203	"VSM SDRAM Bank1 Physical memory device test goes wrong."
20607	"Error audio encoder interrupt cannot initialise empress"	30204	"VSM SDRAM Bank2 Memory databus test goes wrong."
20608	"Error occurred while getting interrupt reason"	30205	"VSM SDRAM Bank2 Memory addressbus test goes wrong."
20700	"Error audio encoder I2C cannot reset DSP through I2C"	30206	"VSM SDRAM Bank2 Physical memory device test goes wrong."
20702	"Error audio encoder cannot download boot"	30300	"VSM interrupt register A has a -stuck at- error for value."
20703	"Error audio encoder cannot download TEST code"	30301	"VSM interrupt register B has a -stuck at- error for value."
20704	"Error audio encoder I2C bus busy"	30302	"VSM interrupt register B has a -stuck at- error for value."
20705	"Error audio encoder I2C cannot write slave address"	30303	"Interrupt A wasn't raised."
20706	"Error audio encoder I2C no acknowledge received"	30304	"Interrupt B wasn't raised."
20707	"Error audio encoder I2C cannot send/receive data"	30305	"Interrupts A and B were raised."
20708	"Error audio encoder received data through I2C was invalid"	30400	"VSM SDRAM Bank1 Memory databus test goes wrong."
20800	"I2C access failed."	30401	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
20802	"SA7118 VIP can not be initialised."	30402	"VSM SDRAM Bank1 Physical memory device test goes wrong."
20903	"Invalid input"	30403	"VSM SDRAM Bank1 Physical memory device test goes wrong."
20900	"B1.B2, B3.B4, B5.B6, B7.B8, B9.B10, B11.B12."	30404	"VSM SDRAM Bank2 Memory databus test goes wrong."
20901	"Firmware download of EMPRESS failed"	30405	"VSM SDRAM Bank2 Memory addressbus test goes wrong."
20902	"I2C bus busy before start"	30406	"VSM SDRAM Bank2 Physical memory device test goes wrong."
20903	"EMPRESS access time-out"	30500	"Communication with the analogue board fails."
20904	"No acknowledge from the EMPRESS"	30501	"Echo test to analogue board returned wrong string."
20905	"No data send to the EMPRESS"	30502	"VSM SDRAM Bank1 Memory databus test goes wrong."
20906	"No data received from the EMPRESS"	40000	"VSM SDRAM Bank2 Memory databus test goes wrong."
30000	"VSM SDRAM Bank1 Memory databus test goes wrong."	40001	"VSM SDRAM Bank2 Memory addressbus test goes wrong."
30001	"VSM SDRAM Bank1 Memory addressbus test goes wrong."	40100	"VSM SDRAM Bank2 Memory databus test goes wrong."
30002	"VSM SDRAM Bank1 Physical memory device test goes wrong."	40101	"VSM SDRAM Bank2 Memory addressbus test goes wrong."
30003	"VSM SDRAM Bank1 Physical memory device test goes wrong."	40102	"VSM SDRAM Bank2 Memory databus test goes wrong."
30004	"VSM SDRAM Bank2 Memory databus test goes wrong."	40200	"VSM SDRAM Bank2 Memory addressbus test goes wrong."
30005	"VSM SDRAM Bank2 Memory addressbus test goes wrong."	40201	"VSM SDRAM Bank2 Physical memory device test goes wrong."
30006	"VSM SDRAM Bank2 Physical memory device test goes wrong."	40202	"VSM SDRAM Bank2 Physical memory device test goes wrong."
30007	"VSM SDRAM Bank1 VSM interrupt register A has a -stuck at- error for value."	40300	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."
30008	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."	40301	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."
30100	"VSM SDRAM Bank1 Memory databus test goes wrong."	40400	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."
30101	"VSM SDRAM Bank1 Memory addressbus test goes wrong."	40401	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."
30102	"VSM SDRAM Bank1 Memory addressbus test goes wrong."	40402	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."
30103	"VSM SDRAM Bank1 Physical memory device test goes wrong."	40403	"VSM SDRAM Bank2 VSM interrupt register A has a -stuck at- error for value."
30104	"VSM SDRAM Bank2 Memory databus test goes wrong."	40700	"VSM SDRAM Bank1 Memory databus test goes wrong."
30105	"VSM SDRAM Bank2 Memory addressbus test goes wrong."	40701	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30106	"VSM SDRAM Bank2 Physical memory device test goes wrong."	40900	"VSM SDRAM Bank1 Memory addressbus test goes wrong."
30200	"VSM SDRAM Bank1 Memory databus test goes wrong."	40901	"VSM SDRAM Bank1 Physical memory device test goes wrong."
30201	"VSM SDRAM Bank1 Memory addressbus test goes wrong."	41000	"VSM SDRAM Bank2 Memory databus test goes wrong."
30202	"VSM SDRAM Bank1 Memory addressbus test goes wrong."	41001	"VSM SDRAM Bank2 Memory addressbus test goes wrong."

Error Nr	Error String	Error Nr	Error String
50102	"Execution of the command on the analogue board failed."	50206	"The frontpanel did not show a starburst."
50103	"The frontpanel could not be accessed by the analogue board."	50207	"The user skipped the FP-which pattern test."
50200	"Execution of the command on the analogue board failed."	50208	"The user returned an unknown confirmation: confirmation"
50204	"Execution of the command on the analogue board failed."	50209	"The frontpanel did not show horizontal segments."
50205	"The frontpanel could not be accessed by the analogue board."	50210	"The frontpanel did not show vertical segments."
50206	"The frontpanel did not show a starburst."	50300	"Execution of the command on the analogue board failed."
50207	"The user skipped the FP-which pattern test."	50304	"Execution of the command on the analogue board failed."
50208	"The user returned an unknown confirmation: confirmation"	50305	"The frontpanel could not be accessed by the analogue board."
50209	"The frontpanel did not show horizontal segments."	50306	"The frontpanel did not light all labels."
50210	"The frontpanel did not show vertical segments."	50307	"The user skipped the test of the FP-label test."
50300	"Execution of the command on the analogue board failed."	50308	"The user returned an unknown confirmation: confirmation"
50304	"Execution of the command on the analogue board failed."	50400	"Execution of the command on the analogue board failed."
50305	"The frontpanel could not be accessed by the analogue board."	50404	"Execution of the command on the analogue board failed."
50306	"The frontpanel did not light all labels."	50405	"The frontpanel could not be accessed by the analogue board."
50307	"The user skipped the test of the FP-label test."	50406	"The LED's could not be turned on."
50308	"The user returned an unknown confirmation: confirmation"	50407	"The user skipped the test of the FP-LED test."
50400	"Execution of the command on the analogue board failed."	50408	"The user returned an unknown confirmation: confirmation"
50404	"Execution of the command on the analogue board failed."	50500	"Front panel Keyboard: test failed"
50405	"The frontpanel could not be accessed by the analogue board."	50502	"Front panel Keyboard: test aborted"
50406	"The LED's could not be turned on."	50503	"Front panel Keyboard: not all keys were pressed"
50407	"The user skipped the test of the FP-LED test."	50505	"Front panel Keyboard I2C connection failed"
50408	"The user returned an unknown confirmation: confirmation"	50506	"Unable to get slash/version"
50500	"Front panel Keyboard: test failed"	50600	"Front panel Remote control: test failed"
50502	"Front panel Keyboard: test aborted"	50602	"Front panel Remote control: test failed"
50503	"Front panel Keyboard: not all keys were pressed"	50603	"Front panel Remote control: can not access FP"
50505	"Front panel Keyboard I2C connection failed"	50604	"Front panel remote control: can not access FP"
50506	"Unable to get slash/version"	50605	"Front panel remote control: no user input received"
50600	"Front panel Remote control: test failed"	50700	"Execution of the command on the analogue board failed."
50602	"Front panel Remote control: test failed"	50701	"The frontpanel could not be accessed by the analogue board."
50603	"Front panel Remote control: can not access FP"	50702	"The frontpanel could not be accessed by the analogue board."
50604	"Front panel remote control: can not access FP"	50703	"The frontpanel did not show a starburst."
50605	"Front panel remote control: no user input received"	50704	"The user skipped the FP-starburst test."
50700	"Execution of the command on the analogue board failed."	50705	"The user returned an unknown confirmation: confirmation"
50701	"The frontpanel could not be accessed by the analogue board."	50800	"Execution of the command on the analogue board failed."
50702	"The frontpanel could not be accessed by the analogue board."	50801	"The frontpanel could not be accessed by the analogue board."
50703	"The frontpanel did not show a starburst."	50802	"The frontpanel could not be accessed by the analogue board."
50704	"The user skipped the FP-starburst test."	50803	"The frontpanel did not show vertical segments."
50705	"The user returned an unknown confirmation: confirmation"	50804	"The user skipped the FP-vertical segments test."
50800	"Execution of the command on the analogue board failed."	50805	"The user returned an unknown confirmation: confirmation"
50801	"The frontpanel could not be accessed by the analogue board."	50900	"Execution of the command on the analogue board failed."
50802	"The frontpanel could not be accessed by the analogue board."	51000	"Front panel version: FPversion"
50803	"The frontpanel did not show vertical segments."		
50804	"The user skipped the FP-vertical segments test."		
50805	"The user returned an unknown confirmation: confirmation"		

Error Nr	Error String	Error Nr	Error String
50901	"Execution of the command on the analogue board failed."	51400	"Execution of the command on the analogue board failed."
50902	"The frontpanel could not be accessed by the analogue board."	51401	"Execution of the command on the analogue board failed."
50903	"The frontpanel did not show horizontal segments."	51402	"The frontpanel could not be accessed by the analogue board."
50904	"The user skipped the FP-horizontal segments test."	51403	"The beeper did not sound."
50905	"The user returned an unknown confirmation: confirmation"	51404	"The user skipped the FP-Beep test."
51400	"Execution of the command on the analogue board failed."	51405	"The user returned an unknown confirmation: confirmation"
51401	"Execution of the command on the analogue board failed."	51500	"Execution of the command on the analogue board failed."
51402	"The frontpanel could not be accessed by the analogue board."	51501	"Execution of the command on the analogue board failed."
51403	"The beeper did not sound."	51502	"The frontpanel could not be accessed by the analogue board."
51404	"The user skipped the FP-Beep test."	51503	"The display did not display properly."
51405	"The user returned an unknown confirmation: confirmation"	51504	"The user skipped the display test."
51500	"Execution of the command on the analogue board failed."	51505	"The user returned an unknown confirmation: confirmation"
51501	"Execution of the command on the analogue board failed."	51600	"Execution of the command on the analogue board failed."
51502	"The frontpanel could not be accessed by the analogue board."	51601	"Execution of the command on the analogue board failed."
51503	"The display did not display properly."	51602	"The frontpanel could not be accessed by the analogue board."
51504	"The user skipped the display test."	51603	"The display did not display properly."
51505	"The user returned an unknown confirmation: confirmation"	51604	"The user skipped the display dots test."
51600	"Execution of the command on the analogue board failed."	51605	"The user returned an unknown confirmation: confirmation"
51601	"Execution of the command on the analogue board failed."	51700	"Execution of the command on the analogue board failed."
51602	"The frontpanel could not be accessed by the analogue board."	51701	"Execution of the command on the analogue board failed."
51603	"The display did not display properly."	51702	"The frontpanel could not be accessed by the analogue board."
51604	"The user skipped the display dots test."	51703	"The VU grid did not display properly."
51605	"The user returned an unknown confirmation: confirmation"	51704	"The user skipped the VU grid test."
51700	"Execution of the command on the analogue board failed."	51705	"The user returned an unknown confirmation: confirmation"
51701	"Execution of the command on the analogue board failed."	51800	"Execution of the command on the analogue board failed."
51702	"The frontpanel could not be accessed by the analogue board."	51801	"Execution of the command on the analogue board failed."
51703	"The VU grid did not display properly."	51802	"The frontpanel could not be accessed by the analogue board."
51704	"The user skipped the VU grid test."	51803	"The frontpanel could not be dimmed."
51705	"The user returned an unknown confirmation: confirmation"	51804	"The user skipped the FP-Dim test."
51800	"Execution of the command on the analogue board failed."	51805	"The user returned an unknown confirmation: confirmation"
51801	"Execution of the command on the analogue board failed."	51900	"Execution of the command on the analogue board failed."
51802	"The frontpanel could not be accessed by the analogue board."	51901	"Execution of the command on the analogue board failed."
51803	"The frontpanel could not be dimmed."	51902	"The frontpanel could not be accessed by the analogue board."
51804	"The user skipped the FP-Dim test."	51903	"The frontpanel did not show segments blinking."
51805	"The user returned an unknown confirmation: confirmation"	51904	"The user skipped the FP-blinking test."
51900	"Execution of the command on the analogue board failed."	51905	"The user returned an unknown confirmation: confirmation"
51901	"Execution of the command on the analogue board failed."	52000	"Execution of the command on the analogue board failed."
51902	"The frontpanel could not be accessed by the analogue board."		
51903	"The frontpanel did not show segments blinking."		
51904	"The user skipped the FP-blinking test."		
51905	"The user returned an unknown confirmation: confirmation"		

Error Nr	Error String
52001	"Execution of the command on the analogue board failed."
52002	"The frontpanel could not be accessed by the analogue board."
52003	"The frontpanel did not show all segments lit."
52004	"The user skipped the PF-light all segments test."
52005	"The user returned an unknown confirmation: confirmation"
52200	""
52201	"Communication with Analogue Board fails."
52202	"Frontpanel can not be accessed by the Analogue Board."
52300	""
52301	"Communication with Analogue Board fails."
52302	"Frontpanel can not be accessed by the Analogue Board."
60000	""
60100	"Basic Engine returned error number"
60101	"Parity error from Basic Engine to Serial"
60102	"Communication time-out error"
60103	"Unexpected response from Basic Engine"
60104	"Echo loop could not be closed"
60105	"Wrong echo pattern received"
60106	"Version: n1,n2,n3"
60200	"Basic Engine returned error number"
60201	"Parity error from Basic Engine to Serial"
60202	"Communication time-out error"
60203	"Unexpected response from Basic Engine"
60204	"Front Panel failed."
60300	""
60301	"Basic Engine time-out error"
60400	""
60401	"Basic Engine returned error number"
60402	"Parity error from Basic Engine to Serial"
60403	"Communication time-out error"
60404	"Unexpected response from Basic Engine"
60405	"Focus loop could not be closed"
60500	""
60501	"Basic Engine returned error number"
60502	"Parity error from Basic Engine to Serial"
60503	"Communication time-out error"
60504	"Unexpected response from Basic Engine"
60600	""
60601	"Basic Engine returned error number"
60602	"Parity error from Basic Engine to Serial"
60603	"Communication time-out error"
60604	"Unexpected response from Basic Engine"
60700	""
60701	"Basic Engine returned error number"
60702	"Parity error from Basic Engine to Serial"
60703	"Communication time-out error"
60704	"Unexpected response from Basic Engine"
60800	""
60801	"Basic Engine returned error number"
60802	"Parity error from Basic Engine to Serial"

Error Nr	Error String
61905	"Unexpected response from Basic Engine"
62000	""
62001	"Self-Test : errorstring1 Laser-Test : errorstring2 SpindleM-Test: errorstring3 Sledg-eM-Test: errorstring4 Focus-Test : errorstrings"
62100	"The forward sense level is Outlevel"
62101	"Basic Engine returned error number"
62102	"Parity error from Basic Engine to Serial"
62103	"Communication time-out error"
62104	"Unexpected response from Basic Engine"
62200	""
62201	"The BE self-diagnostic-spindle-motor-test failed"
62202	"Basic Engine returned error number"
62203	"Parity error from Basic Engine to Serial"
62204	"Communication time-out error"
62205	"Unexpected response from Basic Engine"
62300	""
62301	"The BE focus-test failed"
62302	"Basic Engine returned error number"
62303	"Parity error from Basic Engine to Serial"
62304	"Communication time-out error"
62305	"Unexpected response from Basic Engine"
62400	""
62401	"The BE self-diagnostic-sledge-motor-test failed"
62402	"Basic Engine returned error number"
62403	"Parity error from Basic Engine to Serial"
62404	"Communication time-out error"
62500	"Unexpected response from Basic Engine"
62600	""
62700	"BE EEPROM address = address -> Byte value = 0xvalue"
62701	"Basic Engine returned error number"
62702	"Parity error from Basic Engine to Serial"
62703	"Communication time-out error"
62704	"Unexpected response from Basic Engine"
62705	"BE read EEPROM: invalid input"
62800	""
62801	"Basic Engine returned error number"
62802	"Parity error from Basic Engine to Serial"
62803	"Communication time-out error"
62804	"Unexpected response from Basic Engine"
62805	"BE write EEPROM: invalid input"
62900	""
62901	"Basic Engine returned error number"
62902	"Parity error from Basic Engine to Serial"
62903	"Communication time-out error"
62904	"Unexpected response from Basic Engine"
62905	"Radial loop could not be closed"
63000	""
63001	"Basic Engine returned error number"
63002	"Parity error from Basic Engine to Serial"
63003	"Communication time-out error"
63004	"Unexpected response from Basic Engine"

Error Nr	Error String
63100	"Number of times Tray went Open/Closed : n1" Total hours the CD laser was on : n2" Total hours the DVD laser was on : n3" Total hours the write laser was on : n4"
63101	"Basic Engine returned error number"
63102	"Parity error from Basic Engine to Serial"
63103	"Communication time-out error"
63104	"Unexpected response from Basic Engine"
63200	""
63201	"Basic Engine returned error number"
63202	"Parity error from Basic Engine to Serial"
63203	"Communication time-out error"
63204	"Unexpected response from Basic Engine"
63300	"Momentary errors (Byte 1 - Byte 7) : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Cumulative errors (Byte 1 - Byte 7) : 0xb1 0xb2 0xb3 0xb4 0xb5 0xb6 0xb7 Fatal errors (Oldest - Youngest) : : 0xb1 0xb2 0xb3 0xb4 0xb5"
63301	"Basic Engine returned error number"
63302	"Parity error from Basic Engine to Serial"
63303	"Communication time-out error"
63304	"Unexpected response from Basic Engine"
63400	""
63401	"Basic Engine returned error number"
63402	"Parity error from Basic Engine to Serial"
63403	"Communication time-out error"
63404	"Unexpected response from Basic Engine"
63500	""
63501	"Basic Engine returned error number"
63502	"Parity error from Basic Engine to Serial"
63503	"Communication time-out error"
63504	"Unexpected response from Basic Engine"
63505	"Errorstring 0 The basic engine will reject all player commands"
63900	""
63901	"Basic Engine returned error number"
63902	"Parity error from Basic Engine to Serial"
63903	"Communication time-out error"
63904	"Unexpected response from Basic Engine"
64000	"BE OPU number = opunumber"
64001	"Basic Engine returned error number"
64002	"Parity error from Basic Engine to Serial"
64003	"Communication time-out error"
64004	"Unexpected response from Basic Engine"
64100	"The data was successfully written on and read from a DVD disc"
64101	"The tray-in command failed"
64102	"The read-TOC command failed"
64103	"The VSM interrupt initialisation failed"
64104	"The set irq command failed"
64105	"No disc or wrong disc inserted"
64106	"The rec-pause command failed"
64107	"The VSM BE out DMA initialisation failed"
64108	"The VSM BE out DMA start failed"
64109	"The VSM BE out DMA start failed"
64110	"The VSM BE out start failed"
64111	"The rec command failed"

Error Nr	Error String
64112	"The VSM out overrun error occurred"
64113	"The record complete interrupt was not raised"
64114	"The get irq command failed"
64115	"There was no interrupt raised by BE"
64116	"The VSM DMA did not finished"
64117	"The stop command after writing failed"
64118	"The VSM Sector processor initialisation failed"
64119	"The VSM sector processor DMA initialisation failed"
64120	"The VSM sector processor DMA start failed"
64121	"The VSM sector processor start failed"
64122	"The seek command failed"
64123	"The VSM sector processor error occurred"
64124	"The read timeout occurred"
64125	"The stop command after reading failed"
64126	"There was a difference found in data at a specific disc sector"
64127	"The result of the self test contains errors"
64128	"An error interrupt was raised by BE"
64129	"The calibrate record command failed"
64130	"Too many retries"
64131	"BE update RAI command after writing failed"
64132	"BE find first recordable address command failed"
64133	"DVD-R disc is full"
64200	" "
64201	"BE I2C initialisation failed"
64202	"This nucleus cannot be executed because the Self-Test failed"
70000	"Echo test OK"
70001	"Echo test returned wrong string."
70002	"Communication with Analogue Board fails"
70300	"SoftwareVersion"
70301	"Can not find segment in FLASH ROM on the Analogue Board"
70302	"Communication with Analogue Board fails"
70400	"HardwareVersion"
70401	"Can not find segment in FLASH ROM on the Analogue Board"
70402	"Communication with Analogue Board fails"
70500	"Clock adjusted OK"
70501	"Can not adjust the clock on the Analogue Board"
70502	"Wrong date/time text size."
70503	"Communication with Analogue Board fails"
70600	"Tuner accessibility test OK"
70601	"Can not access tuner on the Analogue Board."
70602	"Communication with Analogue Board fails"
70700	"Frequency download OK"
70701	"Wrong frequency table size."
70702	"Can not download the frequency table into the analogue NVRAM."
70703	"Can not download the frequency table into the analogue NVRAM."
70704	"Communication with Analogue Board fails"
70800	"Data slicer test OK"
70801	"Test of the Data slicer on the Analogue Board fails."
70802	"Communication with Analogue Board fails"
70900	"Sound Processor test OK"
70901	"Test of the Sound Processor on the Analogue Board fails."
70902	"Communication with Analogue Board fails"
71000	"AV Selector test OK"

Error Nr	Error String
73102	"I2C Write error."
73103	"I2C Read error."
73104	"Communication with Analogue Board fails"
73200	" "
73201	"Storing the Reference Voltage for the Tuner failed"
73202	"Invalid input."
73203	"Communication with Analogue Board fails"
80000	"The DVO module is present in the system."
80001	"The DVO module is not present in the system."
80100	"The DVO module has been reset OK."
80101	"The DVO module is not present in the system"
80102	"The DVO module could not be reset."
80200	"Could not initialise I2C before Reset."
80201	"The DVO board is OK"
80202	"The DVO board is not present in this DVDR."
80203	"Could not initialise I2C."
80204	"Unable to reset the DVO module."
80205	"Unable to receive the reset indication from the DVO module."
80206	"Unable to send the configuration to the DVO module."
80207	"Unable to download the chip ID to the DVO module."
80208	"Unable to set the mode of the DVO module to IDLE."
80209	"Software Error in function HandleStateAwaitingReply !!"
80210	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80211	"We tried to receive a reply for DVO_MAX_RETRIES_ACK times !!"
80212	"We tried to receive a reply for DVO_MAX_RETRIES_REPLY times !!"
80213	"We tried to receive an Ack for DVO_MAX_RETRIES_ACK times!"
80214	"VSM UART error timeout transmitting command"
80215	"VSM UART error timeout receiving reply"
80216	"VSM UART frame error occurred receiving from DVO board"
80217	"VSM UART parity error occurred receiving from DVO board"
80218	"The confirmation/indication from the DVO module is invalid."
80300	"The accessibility of the DVO module is OK."
80301	"The DVO board is not present in this DVDR."
80302	"Could not initialise I2C."
80303	"Unable to reset the DVO module."
80304	"Unable to receive the reset indication from the DVO module."
80305	"Unable to send the configuration to the DVO module."
80306	"Unable to download the chip ID to the DVO module."
80307	"Unable to set the mode of the DVO module to IDLE."
80308	"Software Error in function HandleStateAwaitingReply !!"
80309	"Maximal number of retries reached by HandleStateSending !!"
80310	"We tried to receive a reply for DVO_MAX_RETRIES_ACK times!"

Error Nr	Error String
80311	"We tried to receive a reply for DVO_MAX_RETRIES_ACK times !!"
80312	"We tried to receive a reply for DVO_MAX_RETRIES_REPLY times !!"
80313	"We tried to receive an Ack for DVO_MAX_RETRIES_ACK times!"
80314	"VSM UART error timeout transmitting command"
80315	"VSM UART error timeout receiving reply"
80316	"VSM UART frame error occurred receiving from DVO board"
80317	"VSM UART parity error occurred receiving from DVO board"
80318	"The confirmation/indication from the DVO module is invalid."
80400	"The accessibility of the DVO module is OK."
80401	"The DVO board is not present in this DVDR."
80402	"Could not initialise I2C."
80403	"Unable to reset the DVO module."
80404	"Unable to receive the reset indication from the DVO module."
80405	"Unable to send the configuration to the DVO module."
80406	"Unable to download the chip ID to the DVO module."
80407	"Unable to set the mode of the DVO module to IDLE."
80408	"Software Error in function HandleStateAwaitingReply !!"
80409	"Maximal number of retries reached by HandleStateSending !!"
80410	"We tried to receive a reply for DVO_MAX_RETRIES_ACK times !!"
80411	"We tried to receive a reply for DVO_MAX_RETRIES_REPLY times !!"
80412	"We tried to receive an Ack for DVO_MAX_RETRIES_ACK times!"
80413	"VSM UART error timeout transmitting command"
80414	"VSM UART error timeout receiving reply"
80415	"VSM UART frame error occurred receiving from DVO board"
80416	"VSM UART parity error occurred receiving from DVO board"
80417	"The confirmation/indication from the DVO module is invalid."
80500	" "
80501	"The DVO board is not present in this DVDR."
80502	"The I2C could not be initialised."
80503	"The DVO module could not be reset."
80504	"Unable to receive the reset indication from the DVO module."
80505	"Unable to send the configuration to the DVO module."
80506	"Unable to download the chip ID to the DVO module."
80507	"Unable to set the mode of the DVO module to IDLE."
80508	"Software Error in HandleStateAwaitingReply function!"
80509	"Maximal number of retries reached by HandleStateSending!"
80510	"Maximal number of retries (NACKs) reached (HandleStateSending)"
80511	"We tried to receive a reply for DVO_MAX_RETRIES_ACK times!"

Error Nr	Error String
80512	"We tried to receive a reply for DVO_MAX_RETRIES_REPLY times!"
80513	"We tried to receive an Acknowledge for DVO_MAX_RETRIES_ACK times!"
80514	"VSM UART error timeout transmitting command"
80515	"VSM UART error timeout receiving reply"
80516	"VSM UART frame error occurred receiving from DVO board"
80517	"VSM UART parity error occurred receiving from DVO board"
80518	"The confirmation/indication from the DVO module is invalid."
80519	"Setting the DVO module in/out diagnostics mode failed"
80520	"Invalid Input"
80521	"Getting the errors of the self-test failed"
80522	"Self-test failed"
80600	"
80601	"The DVO board is not present in this DVR."
80602	"The DVO could not be initialised."
80603	"The DVO module could not be reset."
80604	"Unable to receive the reset indication from the DVO module."
80605	"Unable to send the configuration to the DVO module."
80606	"Unable to download the chip ID to the DVO module."
80607	"Unable to set the mode of the DVO module to IDLE."
80608	"Software Error in HandStateAwaitingReply function!"
80609	"Maximal number of retries reached by HandStateSending!"
80610	"Maximal number of retries (NACK's) reached (HandStateSending)"
80611	"We tried to receive a reply for DVO_MAX_RETRIES_ACKREPLY times!"
80612	"We tried to receive a reply for DVO_MAX_RETRIES_REPLY times!"
80613	"We tried to receive an Acknowledge for DVO_MAX_RETRIES_ACK times!"
80614	"VSM UART error timeout transmitting command"
80615	"VSM UART error timeout receiving reply"
80616	"VSM UART frame error occurred receiving from DVO board"
80617	"VSM UART parity error occurred receiving from DVO board"
80618	"The confirmation/indication from the DVO module is invalid."
80619	"Setting the DVO module in/out diagnostics mode failed"
80700	"
80701	"The DVO board is not present in this DVR."
80702	"The I2C could not be initialised."
80703	"The DVO module could not be reset."
80704	"Unable to receive the reset indication from the DVO module."
80705	"Unable to send the configuration to the DVO module."
80706	"Unable to download the chip ID to the DVO module."
80707	"Unable to set the mode of the DVO module to IDLE."
80708	"Software Error in HandStateAwaitingReply function!"

Error Nr	Error String
90225	"The video encoder timed out in BUSY mode, (no VIP input)"
90226	"The video encoder did not return the current bitrate."
90227	"The video encoder did not switch to ENCODING mode."
90228	"The video encoder could not start from STOP/IDLE mode."
90229	"The video encoder did not switch from IDLE to STOP mode."
90300	"
90301	"Initialisation of I2C failed"
90302	"I2C communication to VIP failed"
90303	"Initialisation of VIP failed"
90304	"Generation of Close Caption data failed"
90305	"VIP not locked to video signal"
90306	"Initialisation of VBI Extractor failed"
90307	"No CC data received"
90308	"Closed Caption data overrun"
90309	"Closed Caption data does not match"
90310	"Switch off ColourBar failed"
90400	"
90401	"Initialisation of I2C failed"
90402	"Initialisation of VIP and EMPIRE failed"
90403	"Initialisation of PLL / Link failed."
90404	"Next descriptor address set wrong."
90405	"Turning on the colourbar failed"
90406	"No I2C communication possible to start video encoder."
90407	"Starting the video encoder failed."
90408	"Transfer of data from video encoder to VSM failed."
90409	"Stopping the encoder failed."
90410	"Turning off the colourbar failed."
90411	"Cannot initialize hostdecoder parallel input"
90412	"Next descriptor address set wrong."
90413	"Cannot initialise VSM AV-out port"
90414	"Cannot start VSM AV-out DMA port"
90415	"Cannot start VSM AV-out port"
90416	"Transfer of data from VSM to host decoder failed."
90417	"VSM and Hostdec memory do not match (compared after transfer)"
90418	"Decoding of the video data in the hostdecoder memory failed"
90419	"The data in the hostdecoder is not equal to a colourbar"
90420	"The video encoder did not return the Group Of Picture count."
90421	"The video encoder did not receive data from the VIP."
90422	"Execution of the command on the analogue board failed."
90423	"Initialisation of VIP and EMPRESS failed"
90424	"The video encoder did not return the current status."
90425	"The video encoder timed out in BUSY mode, (no VIP input)"
90426	"The video encoder did not return the current bitrate."
90427	"The video encoder did not switch to ENCODING mode."
90428	"The video encoder could not start from STOP/IDLE mode."

Error Nr	Error String
90429	"The video encoder did not switch from IDLE to STOP mode."
90500	"
90501	"Initialisation of I2C failed"
90502	"I2C communication to VIP failed"
90503	"Initialisation of VIP failed"
90504	"Generation of Close Caption data failed"
90505	"VIP not locked to video signal"
90506	"Initialisation of VBI Extractor failed"
90507	"No CC data received"
90508	"Closed Caption data overrun"
90509	"Closed Caption data does not match"
90510	"Switch off ColourBar failed"
90511	"Execution of the command on the analogue board failed."
90600	"
90601	"Initialisation of I2C failed"
90602	"Initialisation of PLL / Link failed."
90603	"Next descriptor address set wrong."
90604	"Turning on the colourbar failed"
90605	"No I2C communication possible to start video encoder."
90606	"Starting the video encoder failed."
90607	"Transfer of data from video encoder to VSM failed."
90608	"Stopping the encoder failed."
90609	"Turning off the colourbar failed."
90610	"Cannot initialize hostdecoder parallel input"
90611	"Next descriptor address set wrong."
90612	"Cannot initialise VSM AV-out port"
90613	"Cannot start VSM AV-out DMA port"
90614	"Cannot start VSM AV-out port"
90615	"Transfer of data from VSM to host decoder failed."
90616	"VSM and Hostdec memory do not match (compared after transfer)"
90617	"Decoding of the video data in the hostdecoder memory failed"
90618	"The data in the hostdecoder is not equal to a colourbar"
90619	"The video encoder did not return the Group Of Picture count."
90620	"The video encoder did not receive data from the VIP."
90621	"Execution of the command on the analogue board failed."
90622	"Initialisation of VIP and EMPRESS failed"
90623	"The video encoder did not return the current status."
90624	"The video encoder timed out in BUSY mode, (no VIP input)"
90625	"The video encoder did not return the current bitrate."
90626	"The video encoder did not switch to ENCODING mode."
90627	"The video encoder could not start from STOP/IDLE mode."
90628	"The video encoder did not switch from IDLE to STOP mode."
90700	"
90701	"Initialisation of I2C failed"
90702	"I2C communication to VIP failed"
90703	"Initialisation of VIP failed"
90704	"Generation of Close Caption data failed"

Error Nr	Error String
90705	"VIP not locked to video signal"
90706	"Initialisation of VBI Extractor failed"
90707	"No CC data received"
90708	"Closed Caption data overrun"
90709	"Closed Caption data does not match"
90710	"Switch off ColourBar failed"
90711	"Execution of the command on the analogue board failed."
90800	"
90801	"Error routing the audio back to the digital board."
90802	"Error cannot initialise I2C"
90803	"Error cannot initialise VIP"
90804	"Error cannot set ADC enable pin"
90805	"Error cannot set VSM audio clock"
90806	"Error preparing the 12kHz audio-sine"
90807	"Error cannot initialise audio encoder"
90808	"Error cannot initialise VSM audio in port"
90809	"Error cannot initialise VSM audio in DMA port"
90810	"Error cannot initialise VSM audio out DMA port"
90811	"Error cannot initialise audio VSM out port"
90812	"Error cannot initialise host decoder audio in"
90813	"Error loop audio user/dealer cannot start audio encoder"
90814	"Error cannot start VSM audio in DMA port"
90815	"Error starting the 12kHz audio-sine"
90816	"Error transfer data from audio encoder to VSM"
90817	"Error cannot start VSM AV out DMA port"
90818	"Error cannot start VSM AV out port"
90819	"Error transfer data from VSM to host decoder"
90820	"Error: audio data in host memory and VSM memory differ"
90821	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90822	"Error: audio data in host memory contains silence!"
90823	"There is no correct audio frame in the buffer"
90824	"The audio frame has an illegal version bit"
90825	"The audio frame has an illegal bitrate-index"
90826	"The audio frame has an illegal sampling rate"
90827	"The CRC of the audio frame is wrong"
90828	"The audio frame is not MPEG-I layer II"
90829	"Error cannot de-mute DAC on analogue board"
90900	"
90901	"Error routing the audio back to the digital board."
90902	"Error cannot initialise I2C"
90903	"Error cannot initialise VIP"
90904	"Error cannot set ADC enable pin"
90905	"Error cannot set VSM audio clock"
90906	"Error preparing the 12kHz audio-sine"
90907	"Error cannot initialise audio encoder"
90908	"Error cannot initialise VSM audio in port"
90909	"Error cannot initialise VSM audio in DMA port"
90910	"Error cannot initialise VSM audio out DMA port"
90911	"Error cannot initialise audio VSM out port"
90912	"Error cannot initialise host decoder audio in"
90913	"Error loop audio user/dealer cannot start audio encoder"
90914	"Error cannot start VSM audio in DMA port"
90915	"Error starting the 12kHz audio-sine"
90916	"Error transfer data from audio encoder to VSM"
90917	"Error cannot start VSM AV out DMA port"
90918	"Error cannot start VSM AV out port"

Error Nr	Error String
90919	"Error transfer data from VSM to host decoder"
90920	"Error: audio data in host memory and VSM memory differ"
90921	"Error: audio data in host memory contains wrong frequency: frequency Hz"
90922	"Error: audio data in host memory contains silence!"
90923	"There is no correct audio frame in the buffer"
90924	"The audio frame has an illegal version bit"
90925	"The audio frame has an illegal bitrate-index"
90926	"The audio frame has an illegal sampling rate"
90927	"The CRC of the audio frame is wrong"
90928	"The audio frame is not MPEG-I layer II"
90929	"Error cannot de-mute DAC on analogue board"
140000	"
140001	"I2C to Clock failed" or "I2C initialisation failed"
140100	"
140101	"I2C to Clock failed" or "I2C initialisation failed"
141200	"
141201	"Progressive Scan Board I2C bus busy"
141211	"Progressive Scan Board I2C FLI2200 bus busy"
141212	"Progressive Scan Board I2C FLI2200 read access time-out"
141213	"Progressive Scan Board I2C FLI2200 no read access knowledge"
141214	"Progressive Scan Board I2C FLI2200 read failed"
141215	"Progressive Scan Board I2C FLI2200 write access time-out"
141216	"Progressive Scan Board I2C FLI2200 no write access knowledge"
141217	"Progressive Scan Board I2C FLI2200 write failed"
141218	"Progressive Scan Board I2C FLI2200 failed"
141221	"Progressive Scan Board I2C AD7196 bus busy"
141222	"Progressive Scan Board I2C AD7196 read access time-out"
141223	"Progressive Scan Board I2C AD7196 no read access knowledge"
141224	"Progressive Scan Board I2C AD7196 read failed"
141225	"Progressive Scan Board I2C AD7196 write access time-out"
141226	"Progressive Scan Board I2C AD7196 no write access knowledge"
141227	"Progressive Scan Board I2C AD7196 write failed"
141228	"Progressive Scan Board I2C AD7196 failed"
141300	"
141302	"Progressive Scan Route Enable failed"
141400	"Generating test image in Hostidecoder failed"
141401	"
141402	"Progressive Scan Route Disable failed"
141500	"
141501	"Progressive Scan Board I2C failed"
141600	"
141601	"Progressive Scan Board I2C failed"

Error Codes Nucleus 805

Error Code	Description	Bus	Components
0x00	No Error	-	-
0x11	No link register access	PA[8:0] PAD[7:0]	Link i uP
0x12	No link register access or link reset failed	PA[8:0] PAD[7:0] I1394_RSTn	Link i uP FPGA
0x13	No link register access or link reset failed	PA[8:0] PAD[7:0] I1394_RSTn	Link i uP FPGA
0x14	No link register access	PA[8:0] PAD[7:0]	Link i uP
0x15	No link register access	PA[8:0] PAD[7:0]	Link i uP
0x16	No link register access	PA[8:0] PAD[7:0]	Link i uP
0x17	Link reset failed	1394_RSTn	Link i FPGA
0x18	Link reset failed	1394_RSTn	Link i FPGA
0x19	Cycle timer in link chip does not increment	-	Link
0x1A	Interrupt from Link chip does not go low at 8051	LINK_INTn PINT1n	Link i FPGA i uP
0x1B	Interrupt from Link chip does not go high at 8051	LINK_INTn PINT1n	Link i FPGA i uP
0x1C	Submission of read request to PHY timed out	Bus_LP	Phy
0x1D	Reception of read data from PHY timed out	Bus_LP	Phy
0x1E	Improper PHY read address was received from PHY	Bus_LP	Phy
0x1F	PHY write timed out	Bus_LP	Phy
0x20	Could not read reg #2 of PHY	Bus_LP	Phy
0x21	Could not write Oxa4 to reg #1 of phy	Bus_LP	Phy
0x22	Could not write 0x55 to reg #1 of phy	Bus_LP	Phy
0x23	Read incorrect default gapcount from PHY	Bus_LP	Phy
0x24	Read incorrect updated gapcount from PHY	Bus_LP	Phy
0x25	Read incorrect gapcount from PHY after reset	F117 F173	Phy OptoPR
0x26	Expecting no 1394 connectivity, while PHY.CNA indicates connection	F108 PHY_CNA Bus_PC	Phy OptoCNA FPGA
0x27	Expecting 1394 connectivity, while PHY.CNA indicates no connection	F108 PHY_CNA Bus_PC	Phy OptoCNA FPGA
0x28	Expected port1 unconnected, but found connected	Bus_PC	Phy
0x29	PHY read retry limit exceeded	-	Phy
0x2A	Expected port2 unconnected, but found connected	-	Phy
0x2B	Expected port3 unconnected, but found connected	-	Phy
0x2C	Expected 0x1 in lower nibble of PHY reg 7	-	Phy
0x2D	Expected CPS and C bit set in PHY reg 6	-	Phy
0x30	Internal ram problem in address lines	Internal in uP	P89C51RD2
0x31	Internal ram problem in data lines	Internal in uP	P89C51RD2
0x32	External ram problem in address lines	PA[15:0] PAD[7:0] PRDn PWRn	P89C51RD2/CY62256/74HC573
0x33	External ram problem in data lines	PAD[7:0]	P89C51RD2/CY62256/74HC573
0x34	Problem accessing flex scratch register	PAD[7:0]	EPF6024
0x36	INT0n stuck at '0'	PINT0n	EPF6024 / P89C51RD2
0x37	INT0n stuck at '1'	PINT1n	EPF6024 / P89C51RD2
0x38	Problem accessing NW701 registers	HAD[7:0] DV_Asn RWrn DSUn DSLn	EPF6024 / NW701
0x39	Reset line to NW701 not functioning	DV_RSTn	EPF6024 / NW701
0x3A	Checksum of codespace 0x0000-0x00ff is not 0x00	Incorrectly programmed	P89C51RD2
0x44	PHY chip not responding	-	Phy
0x45	LINK chip not responding	-	Phy

5.5 Loop tests

The following loops can be distinguished:

- Loops performed on the digital board only
- User Dealer loops performed on the digital and analogue board
- System loops performed via an external connection: outputs are looped back to the inputs.

5.5.1 Nucleus 900: Digital Audio Loop

This nucleus tests the audio path through the digital board

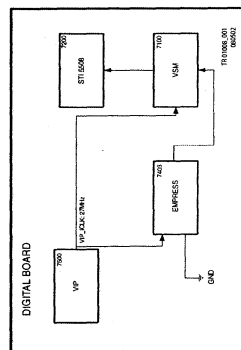
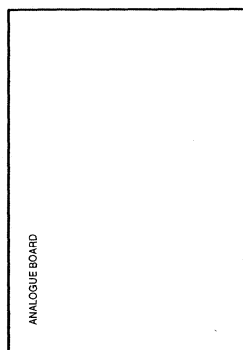
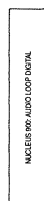


Figure 5-9

5.5.2 Nucleus 901: Audio User Dealer Loop

This Nucleus is only possible in NAFTA sets.

A PCM audio sine of 12kHz is generated in the Host Decoder for a while and sent to the analogue board. The signal coming from the analogue board is encoded again and sent to the memory of the host decoder for comparison. This nucleus tests the components on the audio signal path:

- Host decoder
- Fix connection between connector 1602 (digital board) and connector 1900 (analogue board)
- DAC
- Op-amp
- Start switch IC
- ADC
- Audio Encoder
- VIP
- VSM

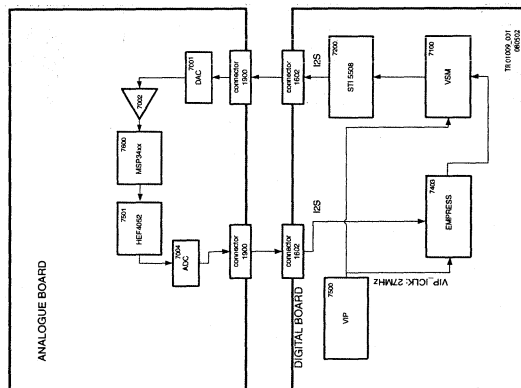
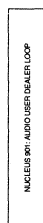


Figure 5-10

EN 76 5. DVDR880-890 /0X1

5.5.3 Nucleus 902: Digital Video Loop

A colourbar generated in the host decoder is looped through the VIP, Empire, and VSM and checked again in the host decoder. The following components are tested on the video signal path:

- VIP
- Empire
- VSM
- Host decoder

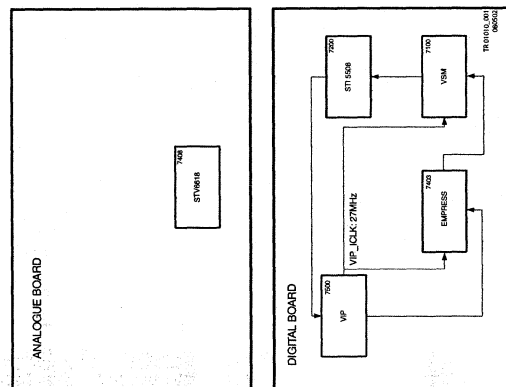
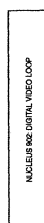


Figure 5-11

5.5.4 Nucleus 903: Digital Video VBI Loop

Nucleus for testing the components on the video VBI signal path:

- The VIP
- The VSM
- The Host Decoder

This is done by using the internal test signal source (digital board only)

Remark: this test is only successful if nucleus 121 is carried out first.

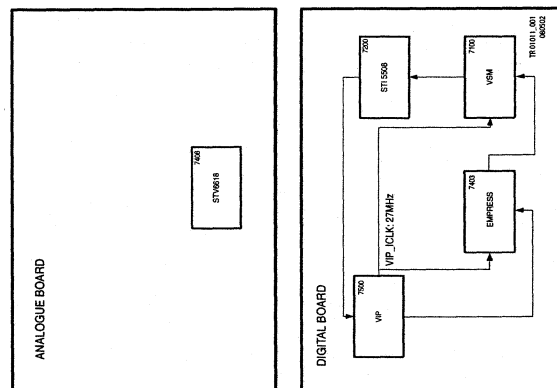


Figure 5-12

Nucleus 904: System Video Loop

Nucleus for testing the components on the video signal system
path:

- The VIP
- The video encoder
- The VSM
- The host decoder
- The analogue board

On the analogue board the video signal will be routed to the SCART (EUROPE) or CINCH (NAFTA). There it will be looped back externally by means of the proper cable

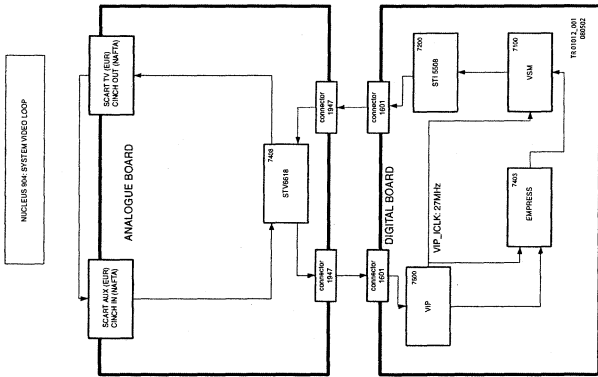


Figure 5-13

leus 905: System Video VBI Loop

- The VIP

- The VSM
 - The Host Decoder
- The video CVBS signal board where it will be located.

The video CVBS signal is routed to the output of the analogue board where it will be looped back by means of an external cable

Remark: this test is only successful if nucleus 121 is carried out first.

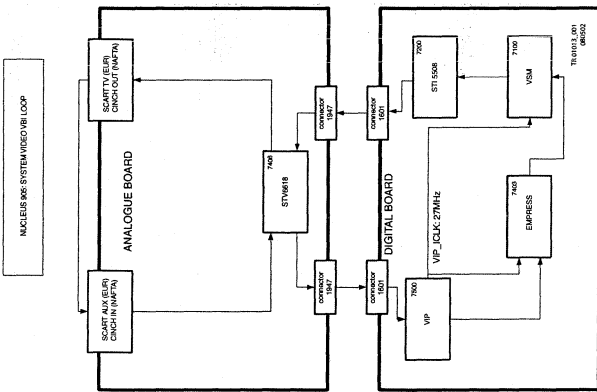


Figure 5-14

Jeus 906: Video User Dealer Loop

Nucleus for testing the components on the video signal system
path:

- The VIP
- The video encoder
- The VSM
- The host decoder
- The analogue board

On the analogue board, the video signal is internally routed back to the digital board.

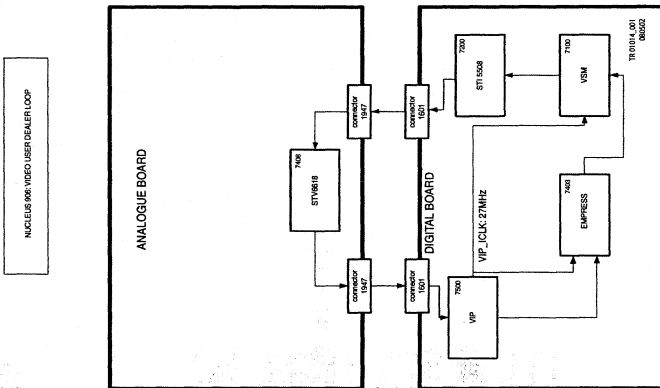


Figure 5-15

907: Video VBI User Dealer Loop

leus tests the components on the video VBI signal

- VIP
VSM
Host Decoder
al is routed ba
this test is only

al is routed back internally on the analogue board
this test is only successful if nucleus 121 is carried out

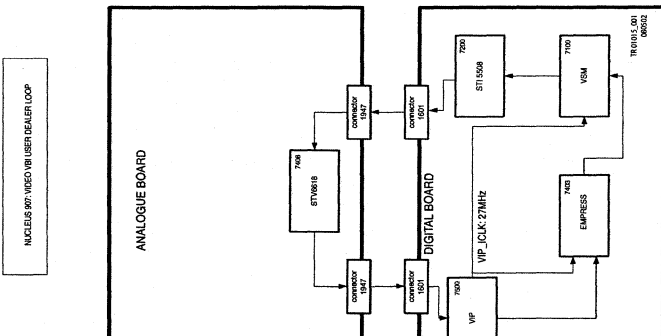


Figure 5-16

The correct Routing path has to be selected by a parameter:

Analog board Version	Selectable parameter	Internal call to nucleus 712
01	1	712.21
11	1	712.21
31	2	712.17
31	3	721.18
31	3	712.19
41	2	712.17
41	3	712.18
41	4	712.19
41	5	712.20
71	4	712.19

Remark: Nucleus 704 gives the analog board version

5.5.10 Nucleus 909: System Audio Loop CINCH (Nafra)

- Nucleus for testing the components on the audio signal path:
- The hostdecoder
 - The analogue board
 - The audio encoder
 - The VSM
- A parameter has to be specified to select the appropriate output routing. This parameter is identical to nucleus 713.

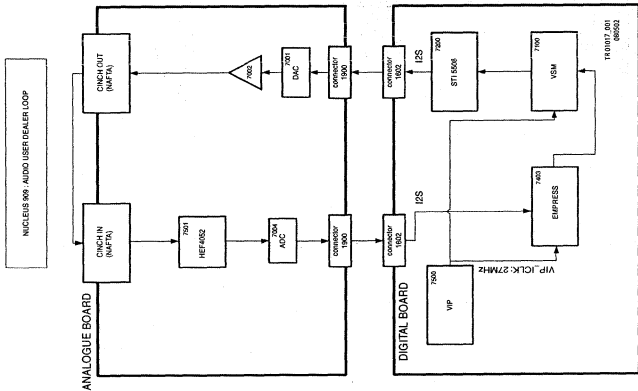


Figure 5-18

5.5.11 Nucleus 910: DVIO Video Input

- Nucleus for testing the components on the video signal path:
- The DVI/O board
 - The VIP
 - The video encoder
 - The VSM
 - The host decoder

Note :This Test is not valid for Nafra in DVDR-Lead. For Europe the sound will be available on scart 2.

5.5.12 Nucleus 911: DVIO Video VIP

- Nucleus for testing the components on the video signal system path.
- The host decoder
 - The analogue board
 - The VIP

On the analogue board the video signal will be routed according to the parameter. There it will be looped back externally by means of the proper cable.

5.5.9 Nucleus 908: System Audio Loop Scart (Europe)

- Nucleus for testing the components on the audio signal path:
- The hostdecoder
 - The analogue board
 - The audio encoder
 - The VSM
- On the analogue board, audio is passed to the SCART connector, where a SCART cable needs to be used to loop back the audio signal to the digital board

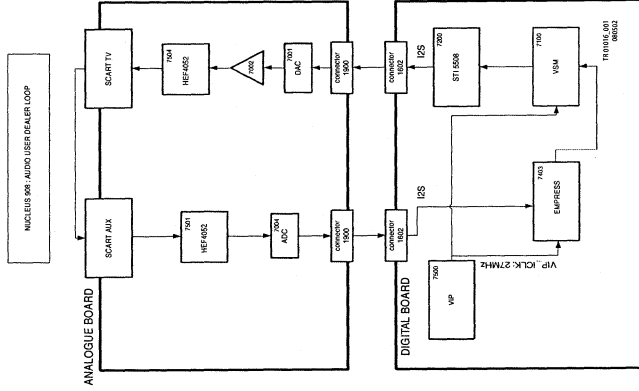
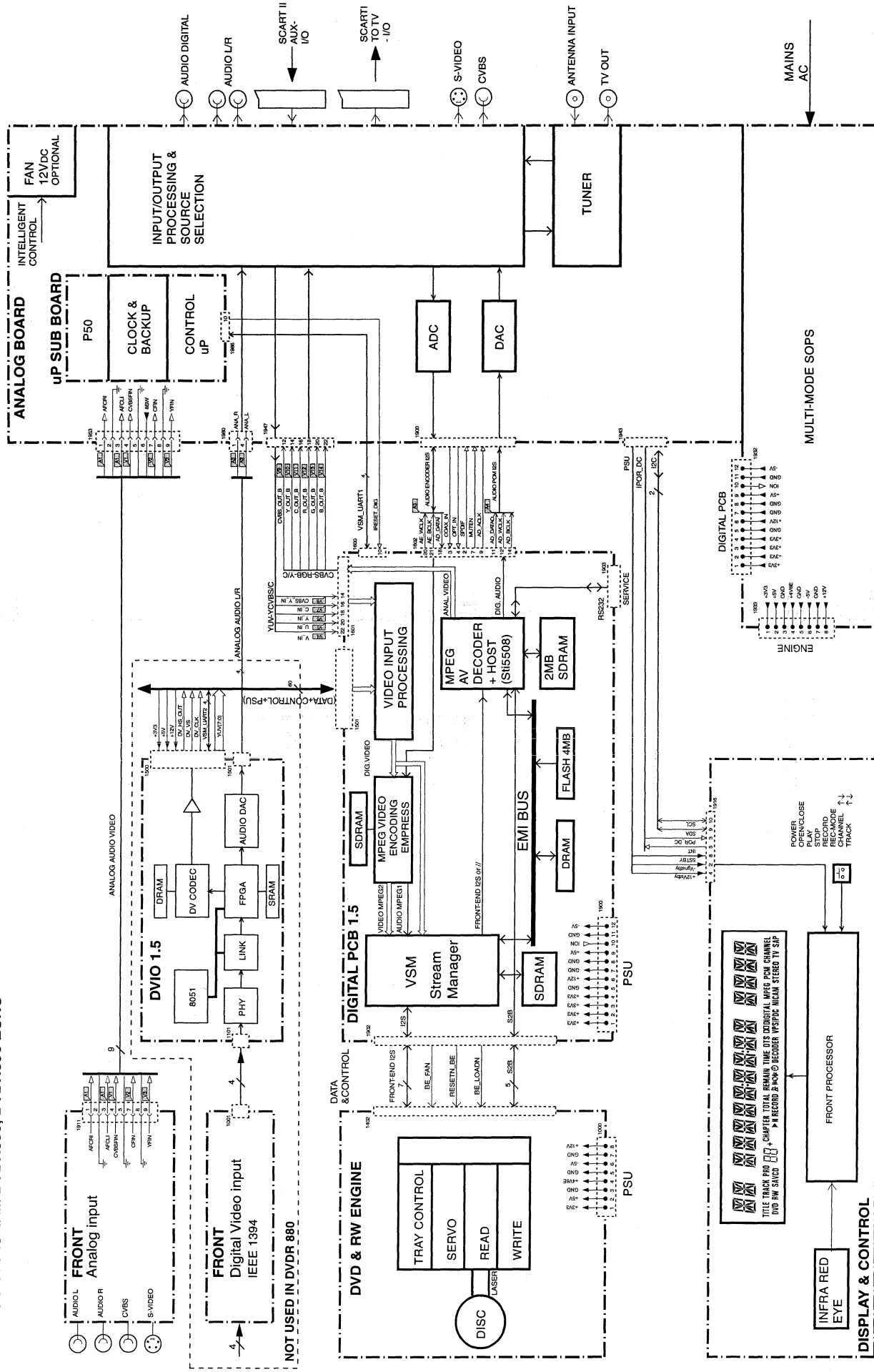


Figure 5-17

6. Block Diagrams, Waveforms, Wiring Diagram.

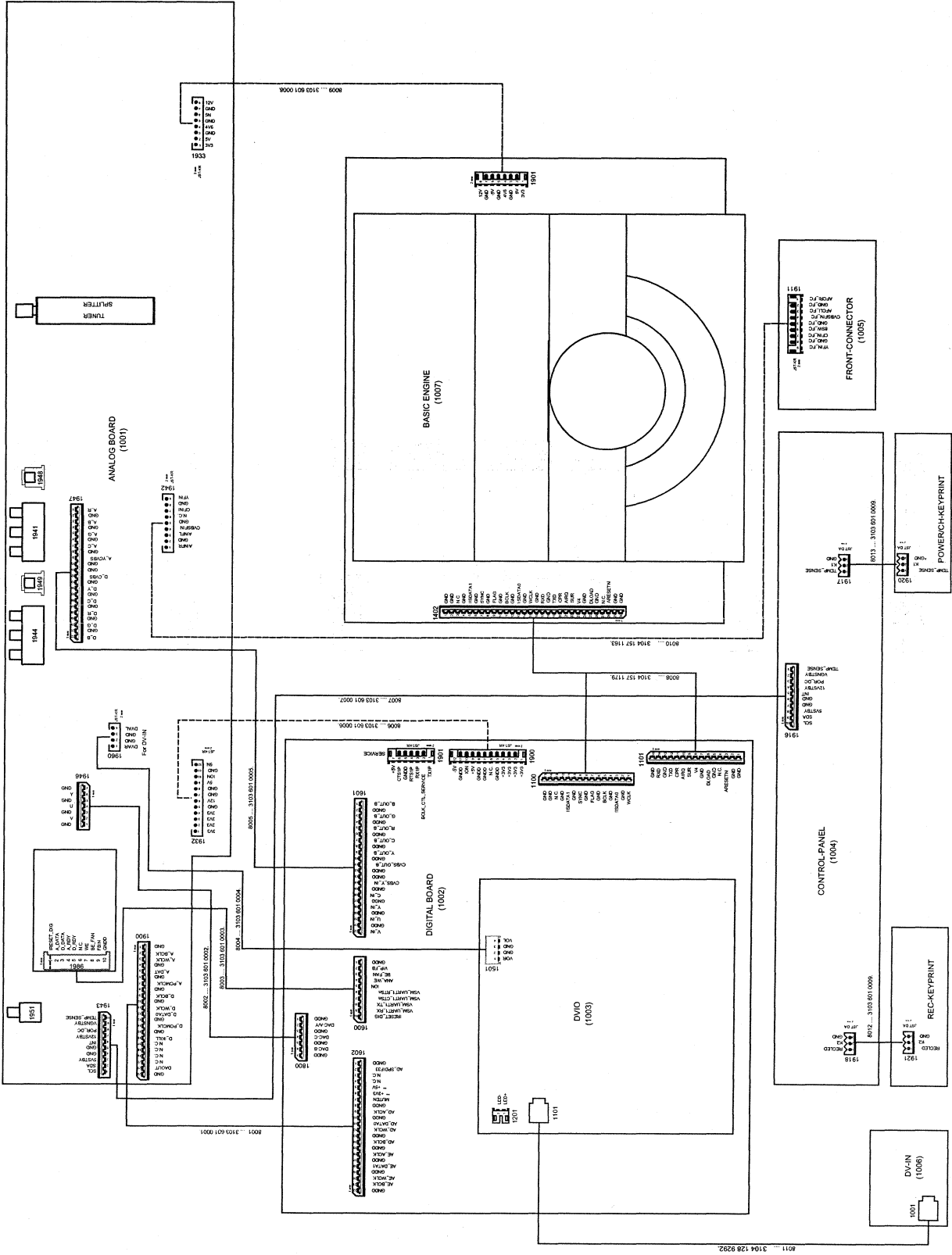
BLOCK DIAGRAM DVDR880, DVDR890 EURO



Blockdiagram Control Lines and Bus Systems

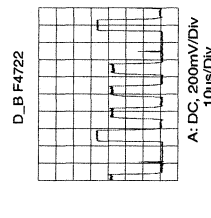
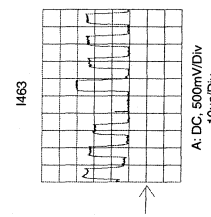
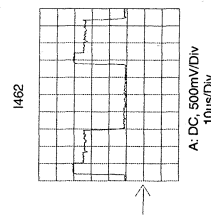
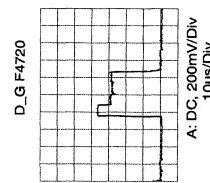
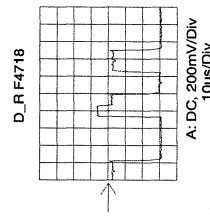
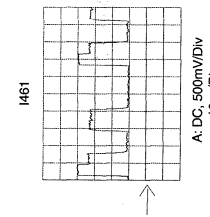
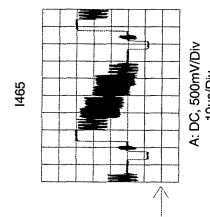
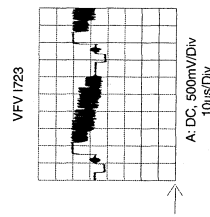
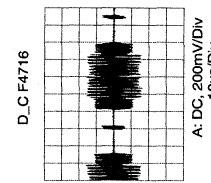
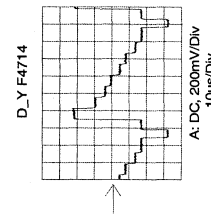
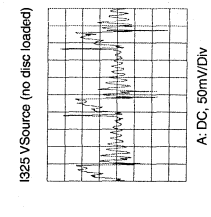
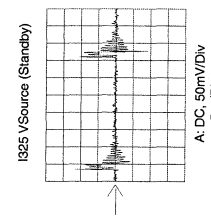
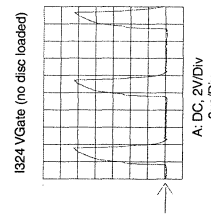
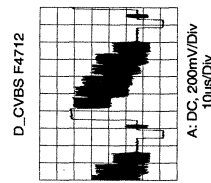
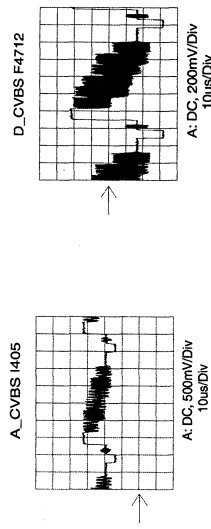
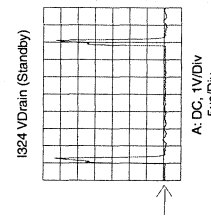
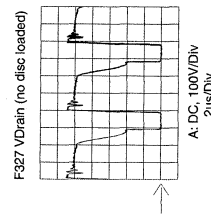
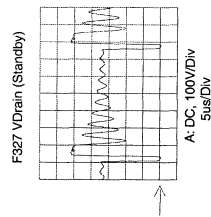


Wiring Diagram



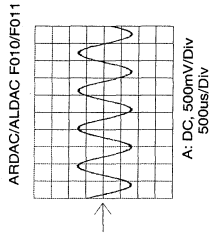
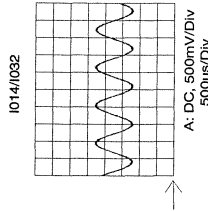
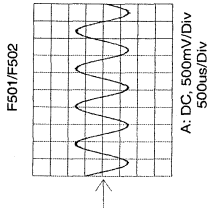
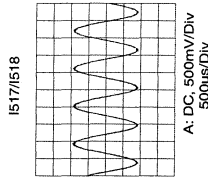
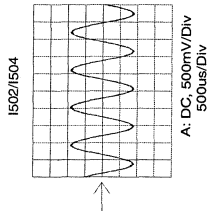
Waveforms

Waveforms Analog Board, uPC Sub PWB

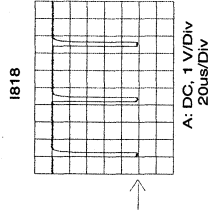
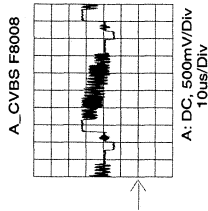
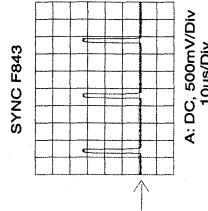
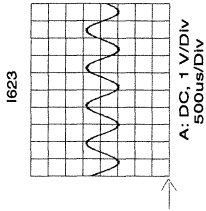


Waveforms Analog Board, uPC Sub PWB

Waveforms Analog Board, uPC Sub PWB



Waveforms Analog Board, uPC Sub PWB



Waveforms Digital Board

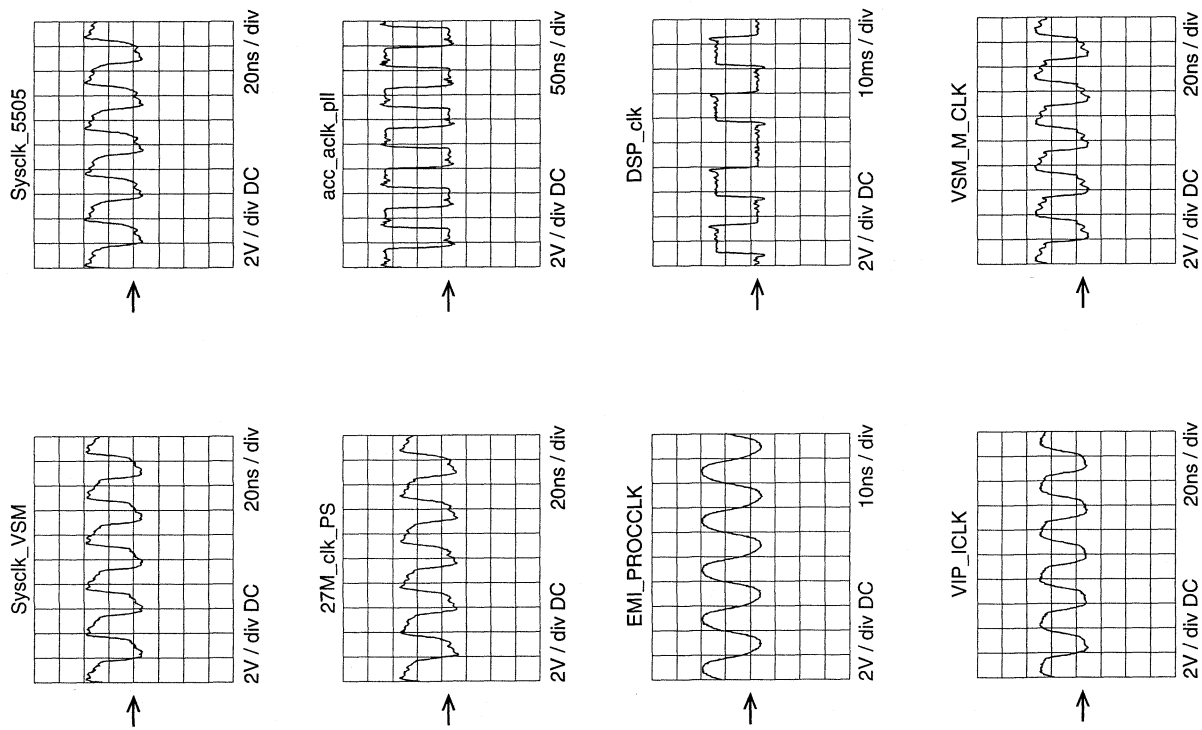


Figure 6-1

Waveforms Digital Board

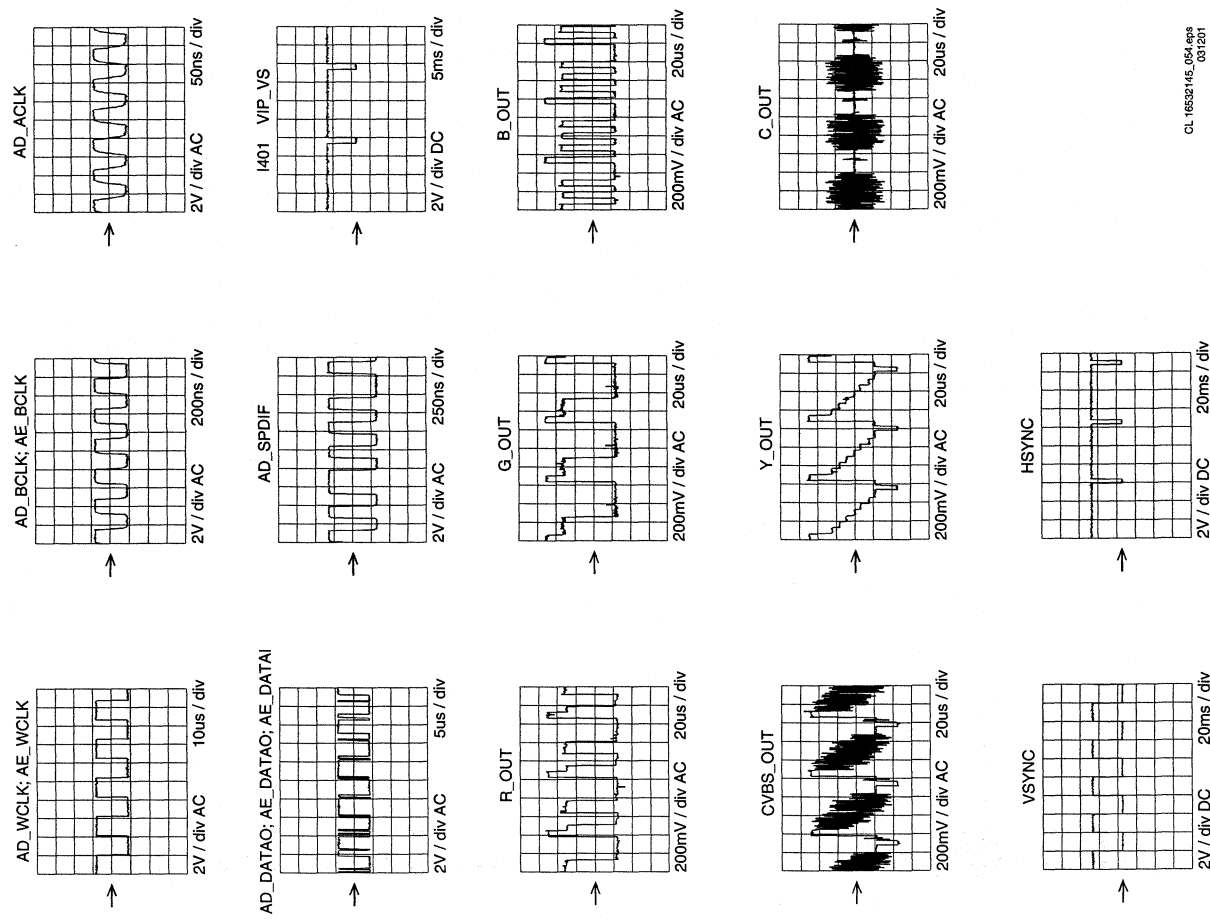


Figure 6-2

Waveforms Digital Board

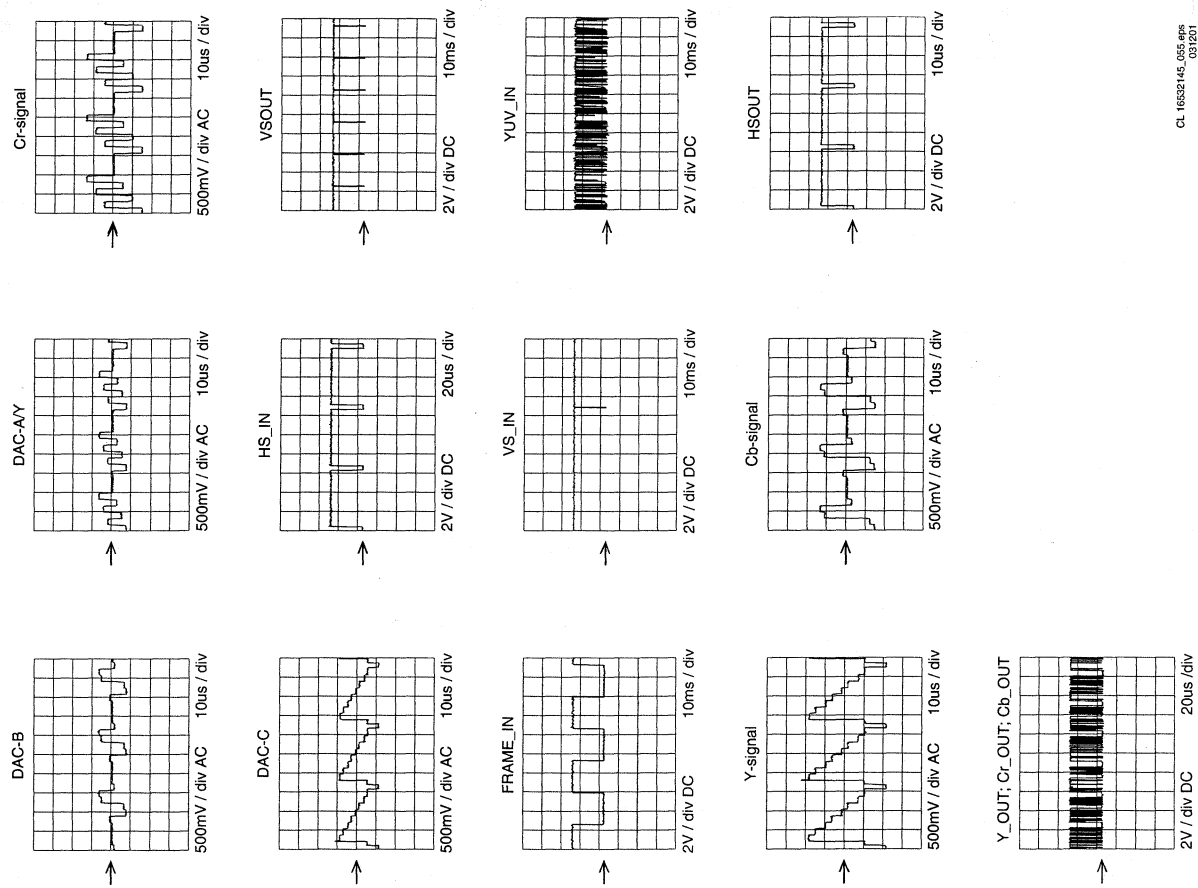


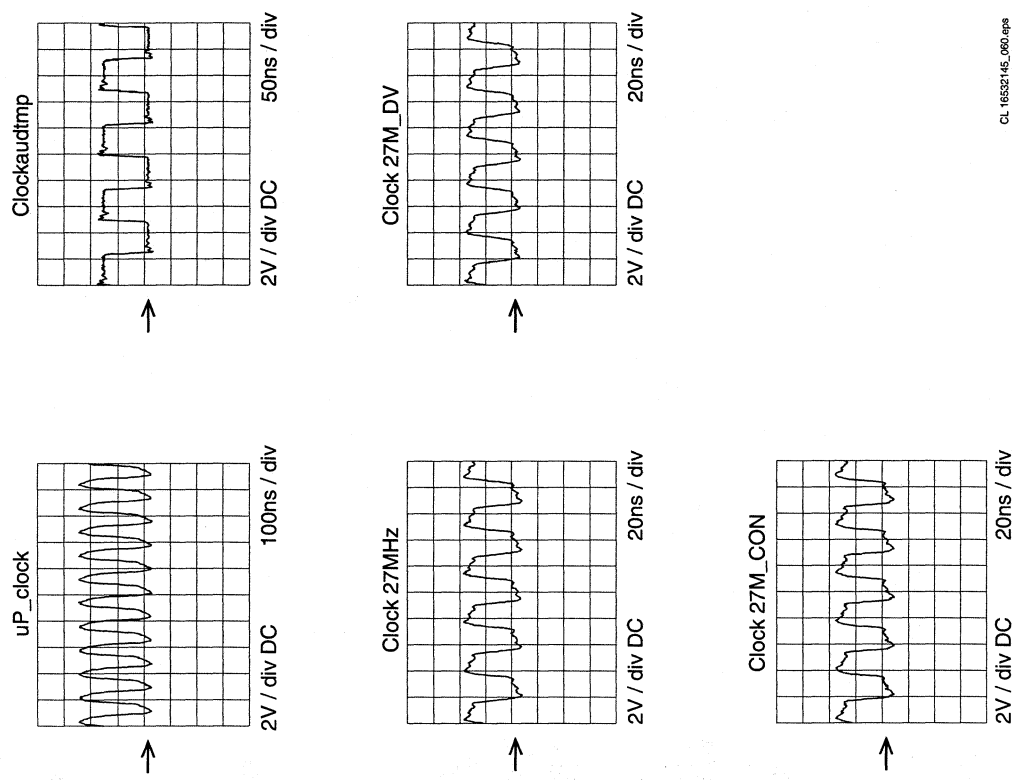
Figure 6-3

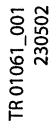
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03/201

Figure 6-4

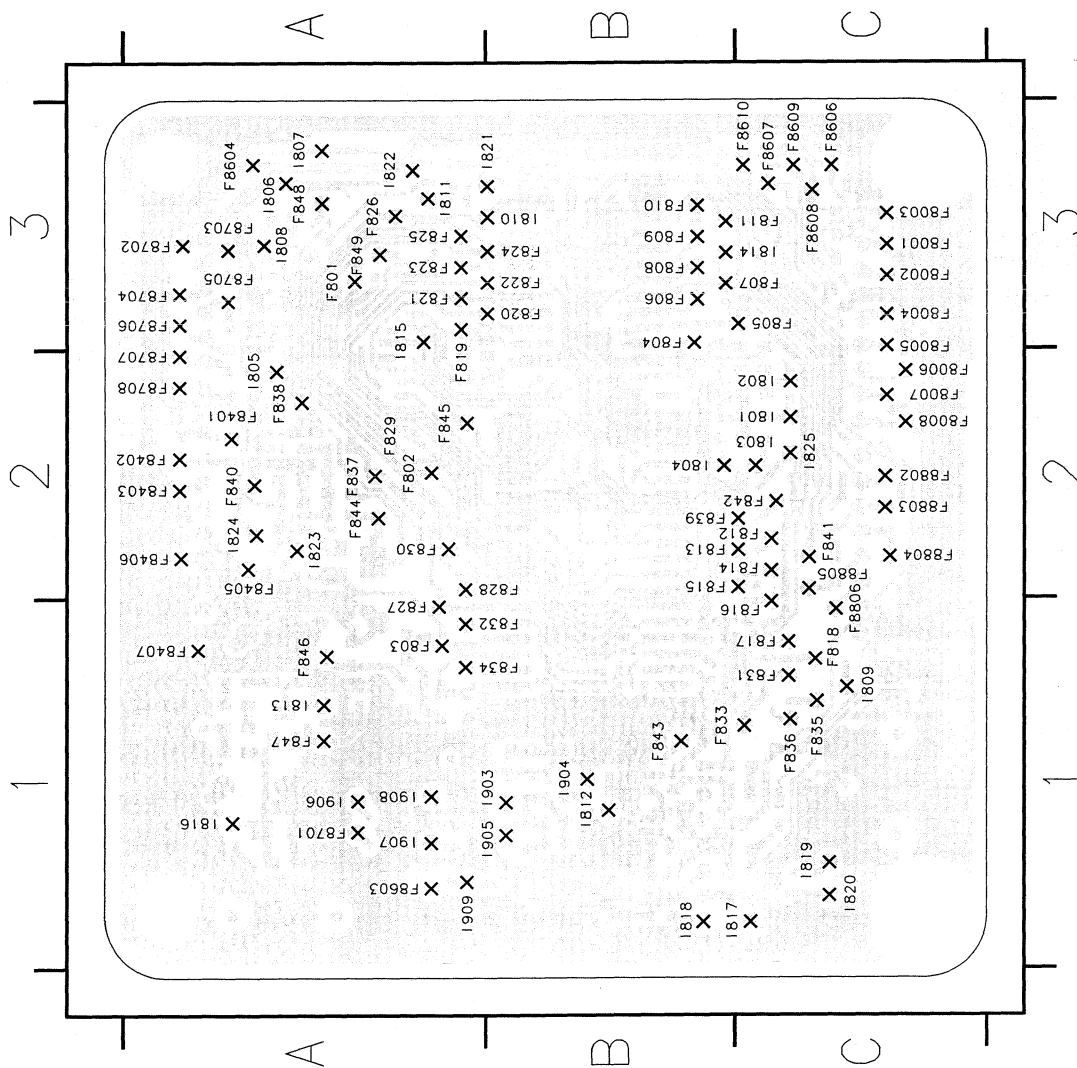
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03/201

Waveforms DVIO



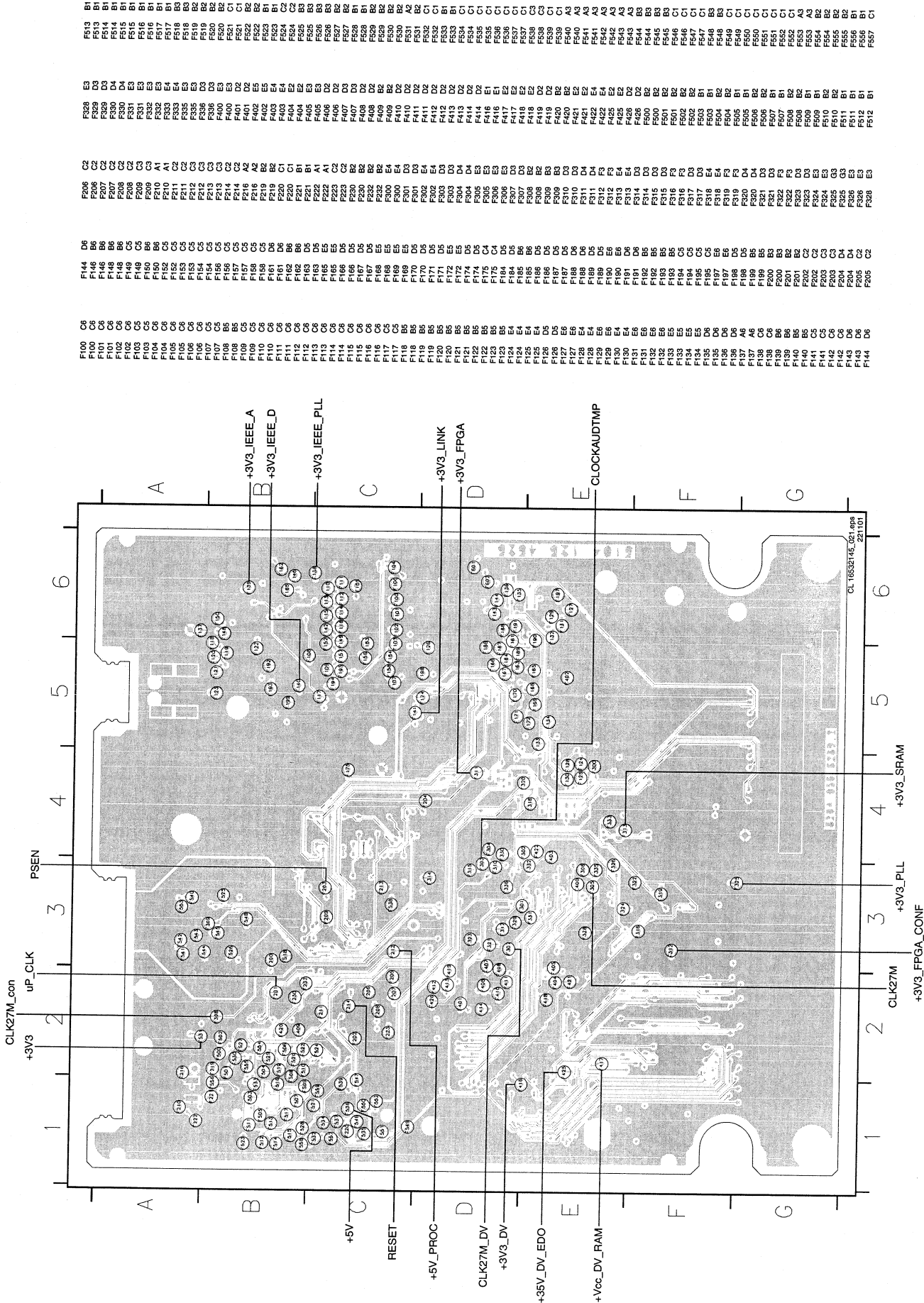


Test points overview UPC12 Sub PCB

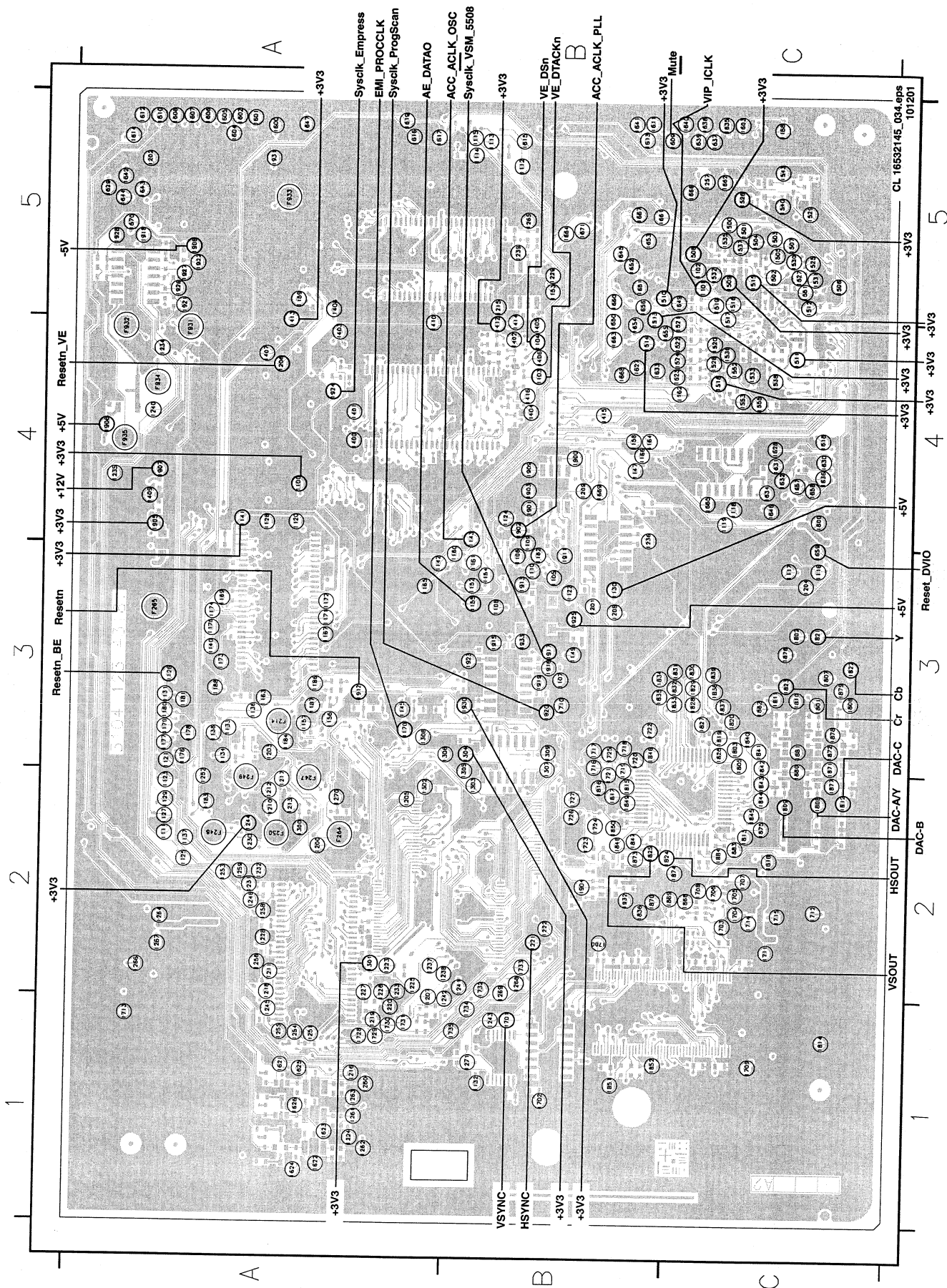
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140502

Test points overview DIVIO Board



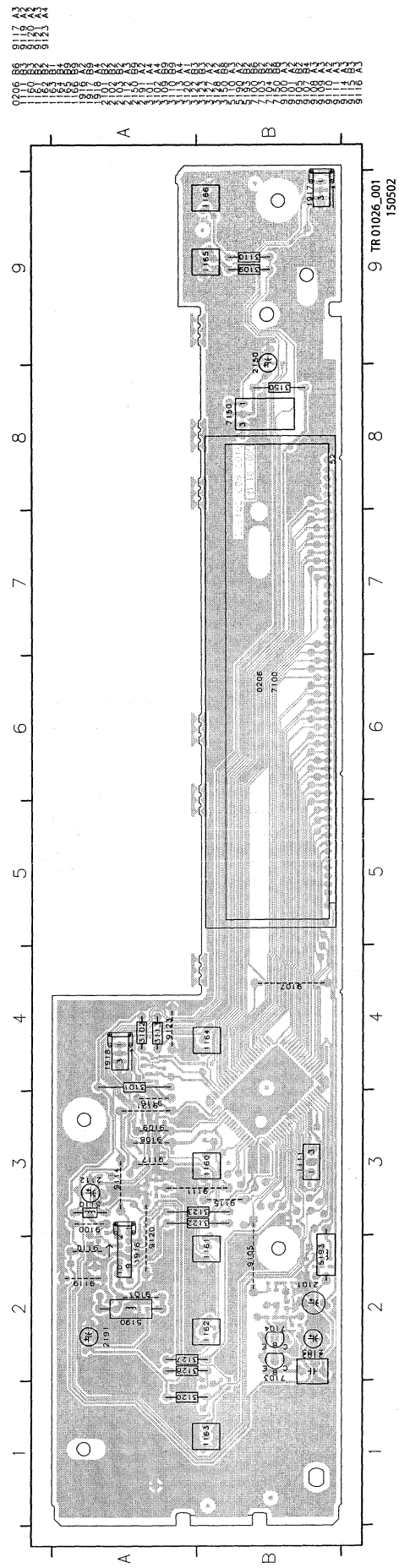
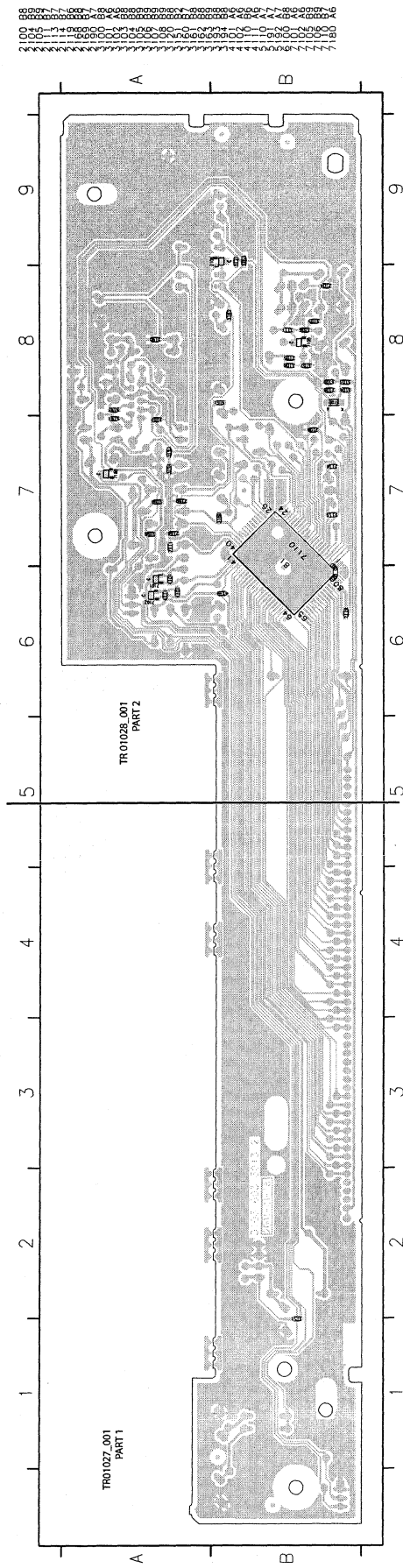
Test points overview Digital Board



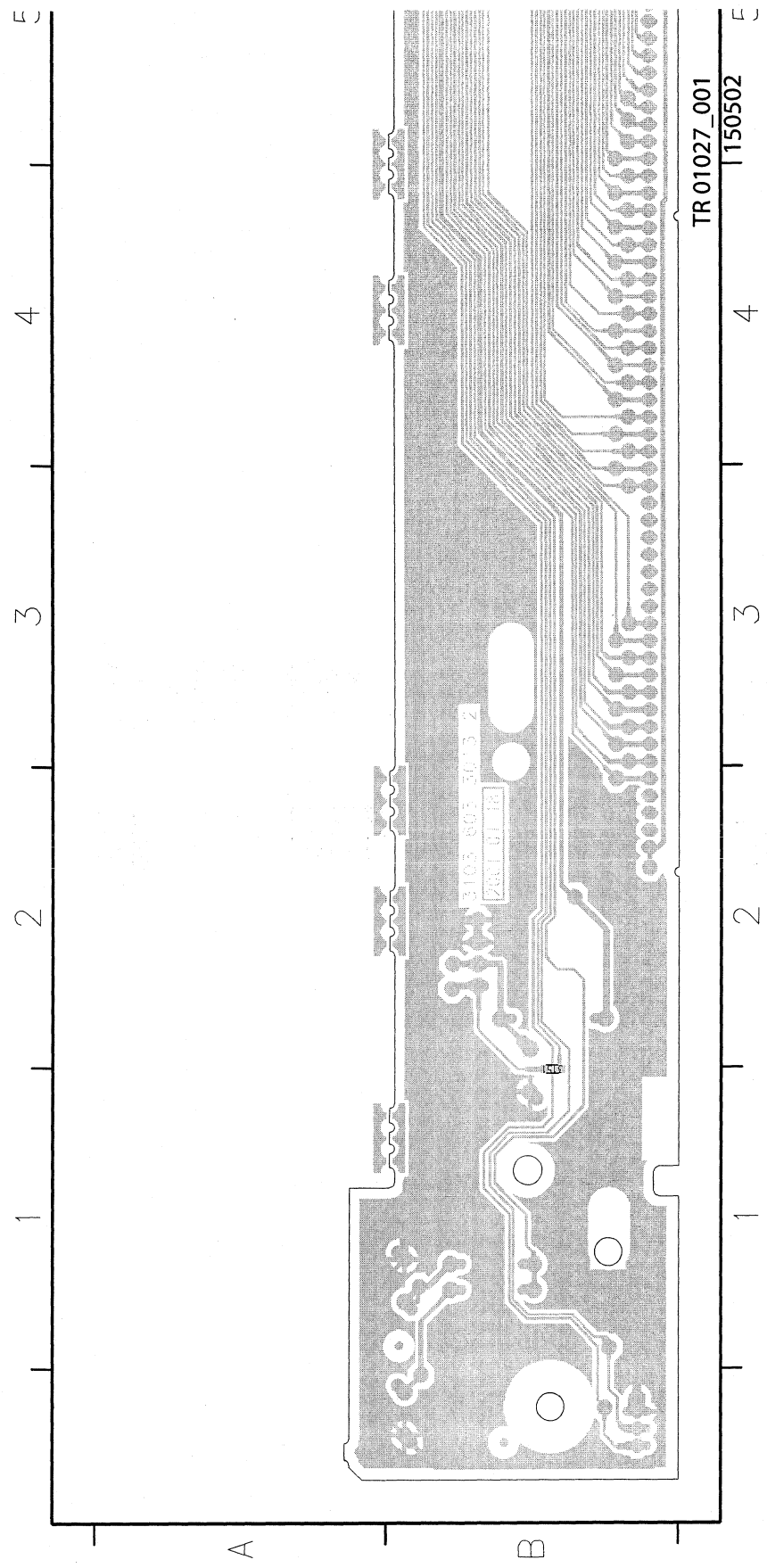
Layout Digital Board (Mapping Testlands)

F214 A3	1175 A3	1300 A2	1610 A5	1720 B3	1880 C3
F247 A2	1176 A3	1301 A2	1611 B5	1721 B2	1881 C3
F248 A2	1177 A3	1302 A2	1612 A5	1722 B3	1882 C3
F249 A2	1178 A3	1303 B2	1613 B5	1723 B2	1883 C2
F250 A2	1179 A3	1304 B3	1614 A5	1724 B2	1884 C2
F264 A2	1180 A3	1305 B3	1615 B5	1725 B3	1900 B4
F265 A3	1181 A3	1306 A3	1616 A5	1726 B2	1901 B4
F331 A4	1182 B3	1307 B3	1617 A5	1727 B2	1902 B4
F332 A4	1183 A2	1308 A3	1618 A2	1728 A1	1903 B4
F333 A5	1184 A3	1309 B3	1619 A5	1729 A1	1904 B2
F334 A4	1185 A3	1400 A4	1621 A1	1730 A1	1905 A4
F335 A4	1187 A3	1401 A4	1622 A1	1731 A1	1906 A4
1100 A4	1188 A3	1402 B4	1623 A1	1732 B2	1907 A4
1101 C5	1200 A2	1403 A4	1624 A1	1733 B2	1908 A5
1102 C5	1201 B3	1404 B4	1625 A1	1734 B1	1909 B4
1103 B4	1202 A5	1405 B4	1626 A1	1735 B1	1911 B3
1104 B4	1203 A3	1406 B4	1627 B4	1800 C4	1912 A3
1105 B3	1204 C3	1407 A4	1628 A5	1801 C3	1913 B3
1106 B3	1205 A2	1408 A5	1629 A5	1802 C3	1915 B3
1107 B3	1206 A4	1409 A4	1630 C4	1803 C3	1916 B3
1108 B3	1207 A2	1410 A4	1631 C4	1805 C3	1917 B3
1109 B4	1208 B3	1412 B4	1632 C4	1806 C3	1918 A5
1110 B3	1209 B4	1413 A4	1633 B4	1807 C3	1919 B3
1111 A2	1210 A2	1414 B4	1634 C4	1808 C2	1920 B3
1112 B5	1211 A2	1415 B4	1635 C5	1809 C2	1921 A5
1113 B5	1212 A2	1416 B4	1636 C4	1810 C3	1922 A5
1114 B5	1213 A2	1500 C5	1637 C5	1811 C3	1923 B3
1115 B5	1215 B5	1501 C5	1638 C5	1812 C2	1924 A4
1116 C3	1216 A1	1502 C5	1639 C5	1813 C2	1925 B3
1117 C3	1217 A2	1503 C5	1640 C5	1814 C1	1926 A5
1118 C4	1218 A2	1504 C5	1641 B5	1815 B2	1927 A5
1119 C4	1219 A1	1505 C5	1642 A5	1816 B2	1928 A5
1120 A4	1220 A1	1506 C5	1643 A5	1817 B2	1930 B3
1121 A3	1221 B2	1507 C5	1644 A5	1818 C2	1931 A5
1122 B3	1222 B2	1508 C5	1645 B5	1819 C3	1932 B2
1123 A2	1223 A2	1509 C5	1646 C4	1820 C3	1933 B3
1124 B4	1224 A1	1510 B5	1647 A5	1821 C3	
1125 A2	1225 A2	1511 C4	1649 C5	1822 C3	
1126 A3	1226 A2	1512 C5	1650 B4	1823 C3	
1127 A2	1227 A2	1513 B5	1651 B5	1824 B2	
1128 A4	1228 A2	1514 B4	1652 B5	1825 B2	
1129 A2	1229 B5	1515 C5	1653 B5	1826 C3	
1130 B3	1230 A3	1516 C5	1654 B4	1827 C3	
1131 A3	1231 A2	1517 C5	1655 B4	1828 C3	
1133 A3	1232 A2	1518 C4	1656 B5	1829 C3	
1134 A3	1234 A4	1520 C4	1658 C4	1831 C3	
1135 A3	1235 A3	1521 C4	1659 C3	1832 C3	
1137 A2	1236 B4	1522 C4	1660 B5	1833 C3	
1138 A3	1237 A2	1523 C4	1661 B5	1834 B3	
1140 A3	1238 A2	1524 C4	1662 C5	1835 B3	
1141 A4	1239 B5	1525 C5	1663 B4	1836 B2	
1143 B4	1241 B2	1527 C5	1664 B5	1837 C3	
1145 A3	1242 B1	1528 C4	1665 C4	1838 C3	
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1149 B3	1244 A1	1530 C5	1668 B4	1841 C3	
1152 B3	1245 A1	1531 C5	1669 B4	1842 C3	
1153 B5	1246 A2	1532 C5	1670 A5	1843 C2	
1154 B3	1251 A1	1533 C4	1671 B5	1844 C2	
1155 B3	1252 A2	1535 C5	1700 B2	1845 C2	
1156 A3	1253 A2	1536 C4	1701 B1	1846 B3	
1157 A3	1254 A1	1537 C5	1702 B1	1847 B2	
1158 A5	1255 A1	1538 C4	1703 C2	1848 B2	
1159 A5	1256 A2	1540 C5	1704 C2	1849 B2	
1160 B3	1257 C5	1543 C5	1705 C2	1850 B2	
1161 B3	1258 A2	1551 C5	1706 C2	1851 B1	
1162 C4	1259 A2	1552 C4	1707 C2	1852 B1	
1163 A3	1260 A1	1553 C4	1708 C2	1853 C2	
1164 B4	1261 A1	1555 C4	1709 C1	1855 C4	
1165 A3	1262 A1	1600 A5	1710 B3	1856 C2	
1166 B4	1263 A1	1601 A5	1711 C2	1857 B2	
1167 A3	1264 A2	1602 A5	1712 C2	1872 C3	
1168 C5	1265 B5	1603 C5	1713 A1	1873 B2	
1169 A3	1266 A2	1604 A5	1714 C2	1874 C2	
1170 A3	1267 A2	1605 A5	1715 C2	1875 C2	
1171 A3	1268 B2	1606 A5	1716 B3	1876 C3	
1172 A3	1269 B2	1607 A5	1717 B3	1877 C2	
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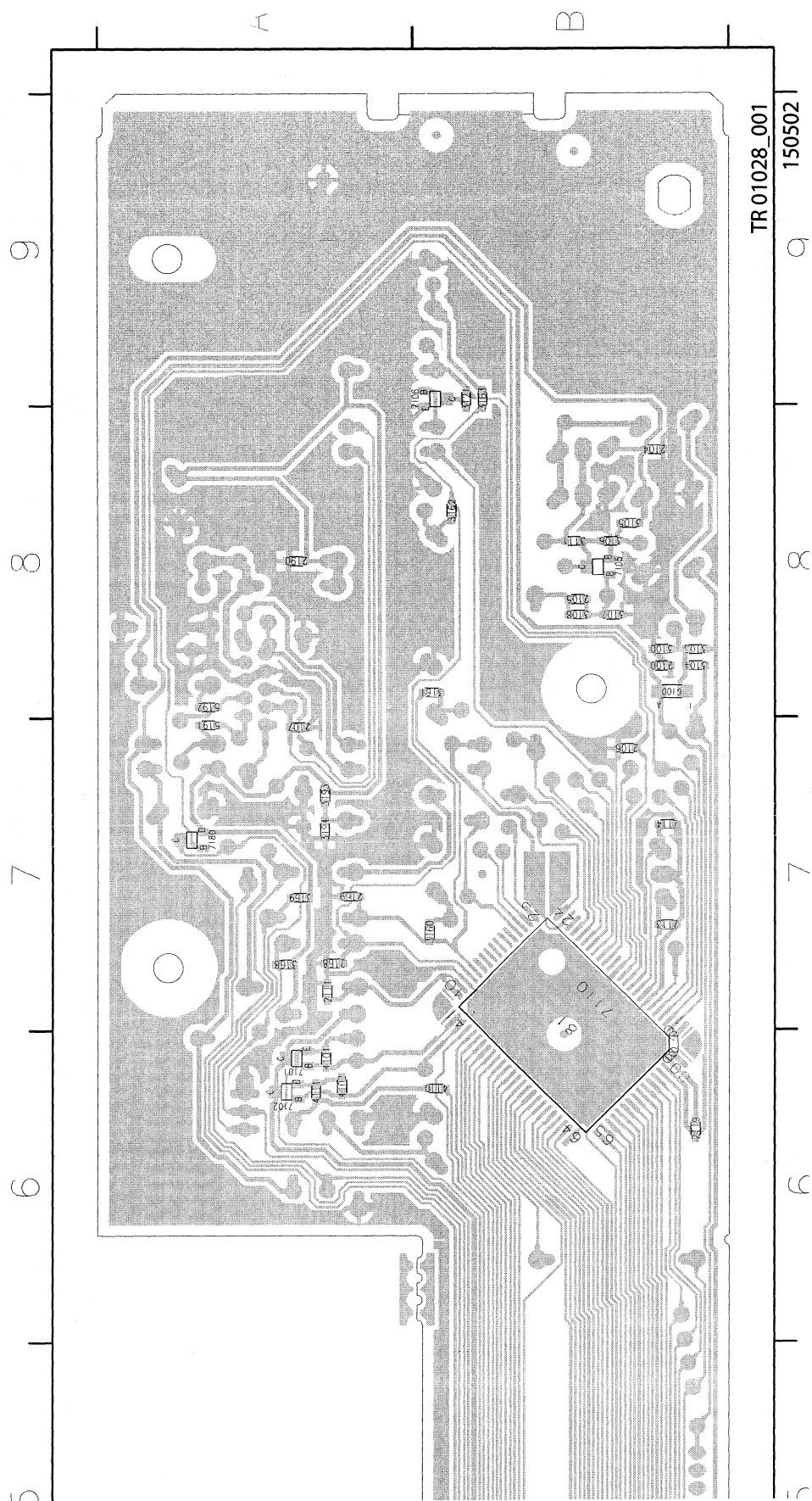
Layout Display Panel (DISP)



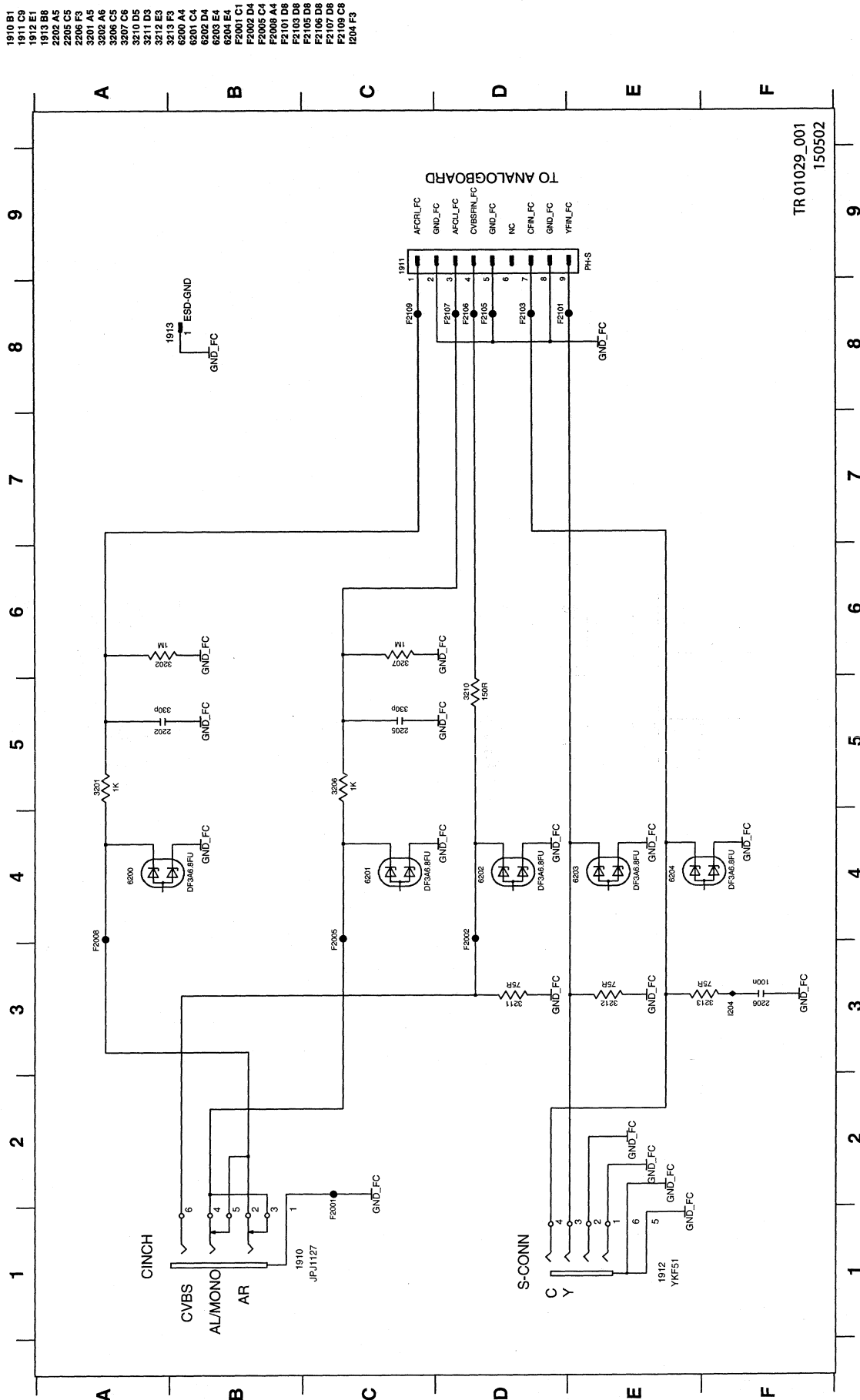
Layout Display Panel (Part 1 Bottom View)



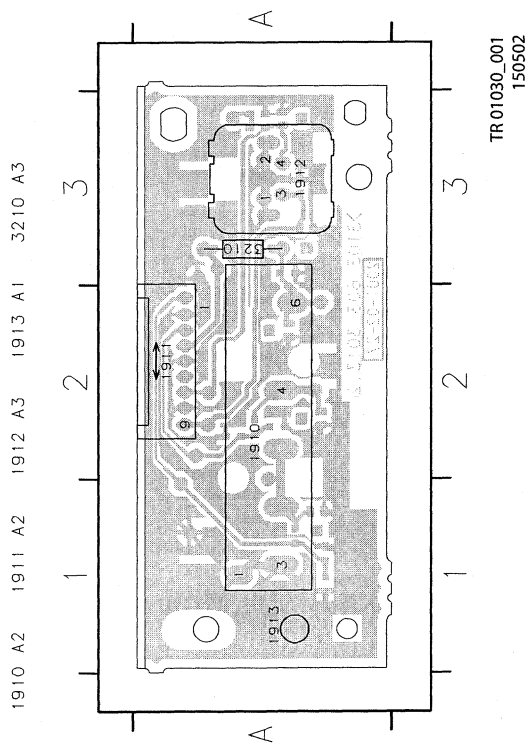
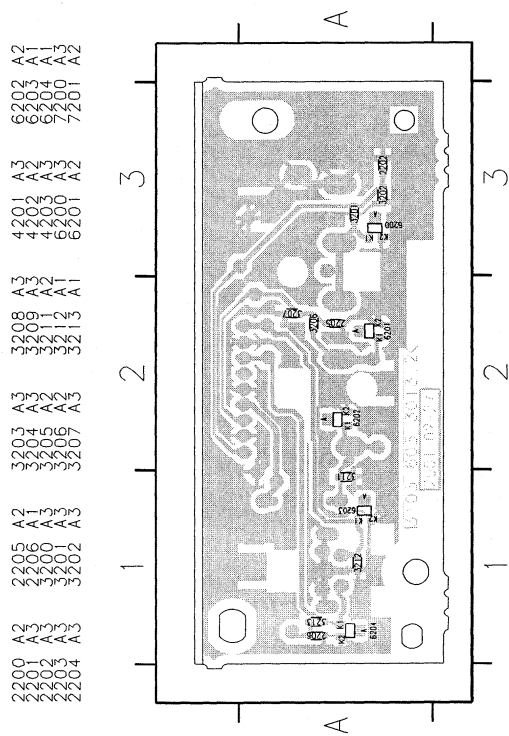
Layout Display Panel (Part 2 Bottom View)



Front Connector Panel (FC)

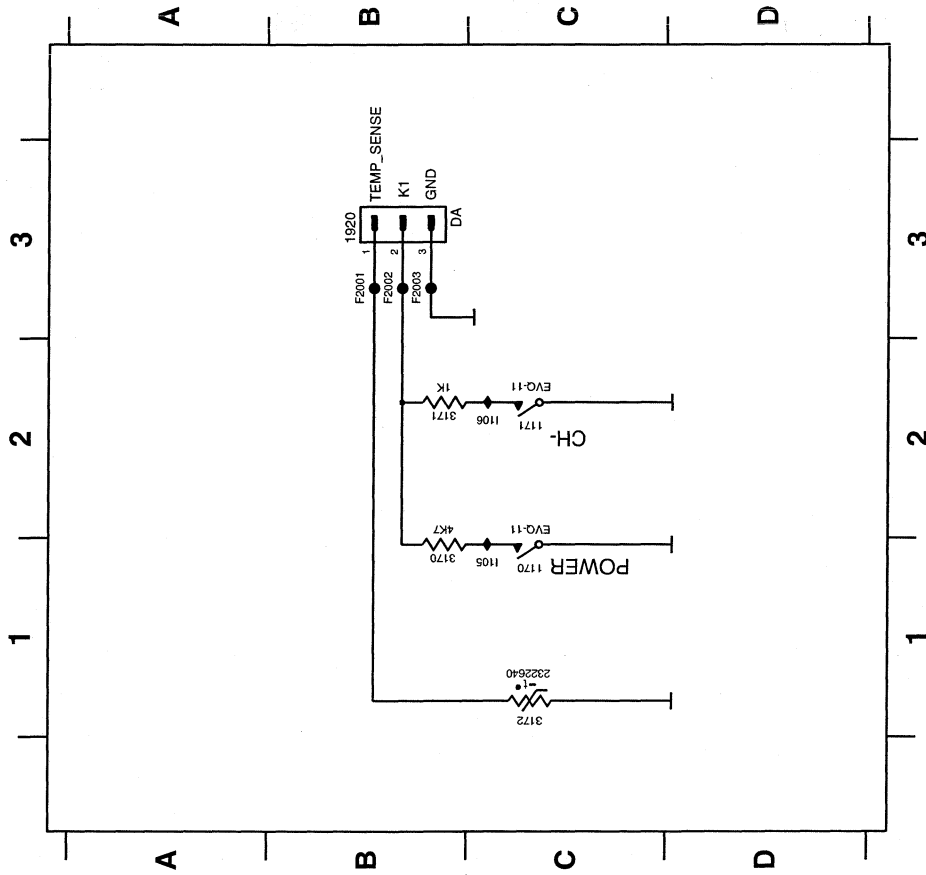


Layout Front Connector Panel (FC)



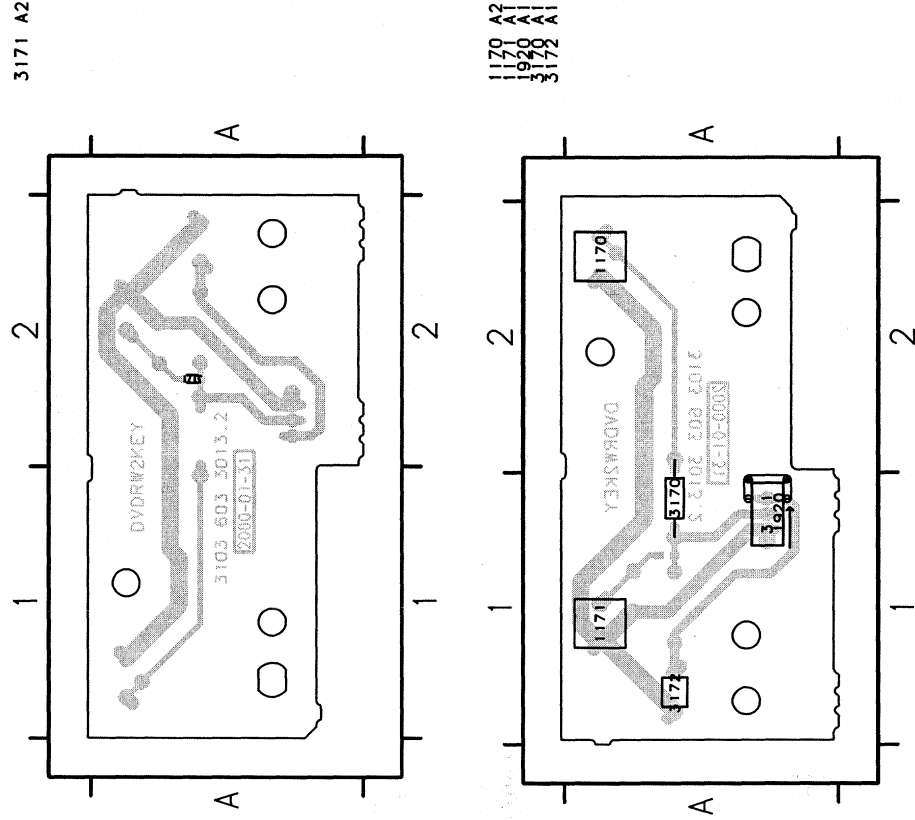
Key Panel (KEY)

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1171 C2 3170 B1 F2001 B3 F2002 B3 1105 C1



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150502

Layout Key Panel (KEY)

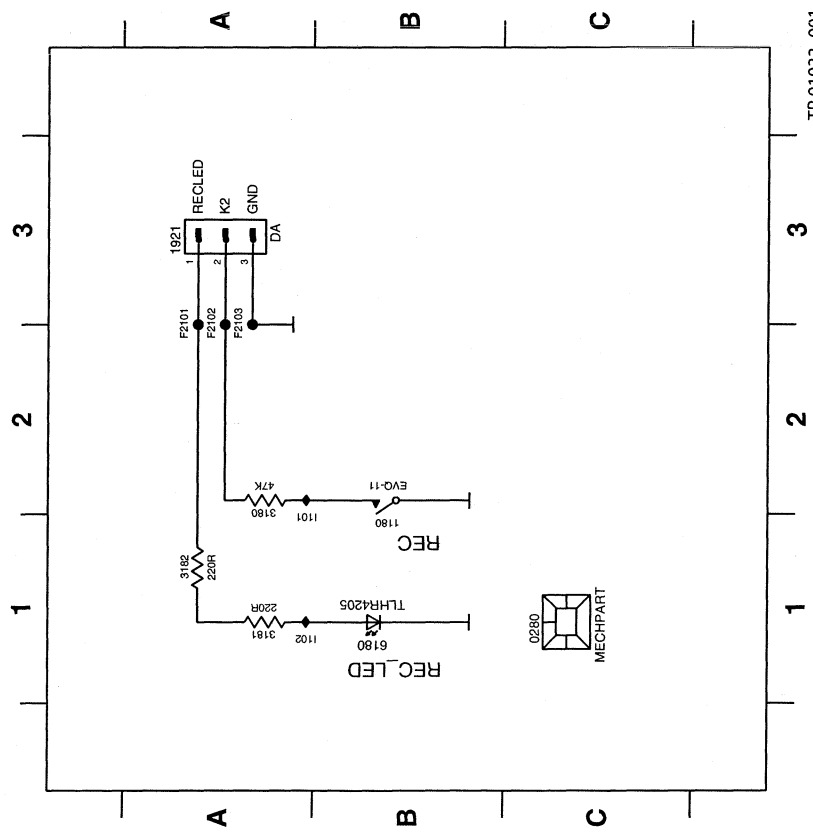


TR 01032_001
150502

Record Key Panel (REC)

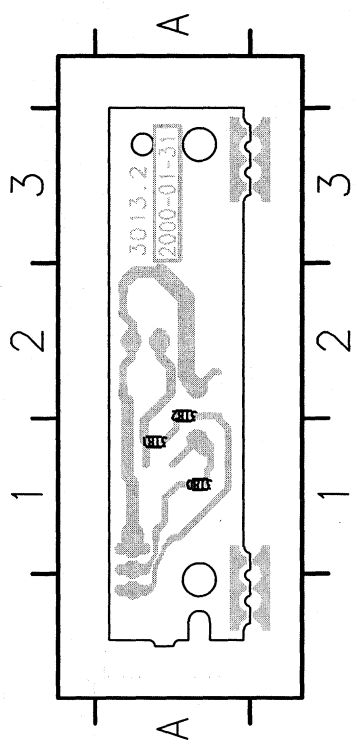
Layout Record Key Panel (REC)

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1180 B1 3180 A2 3182 A1 F2101 A3 F2103 A3 I102 A1

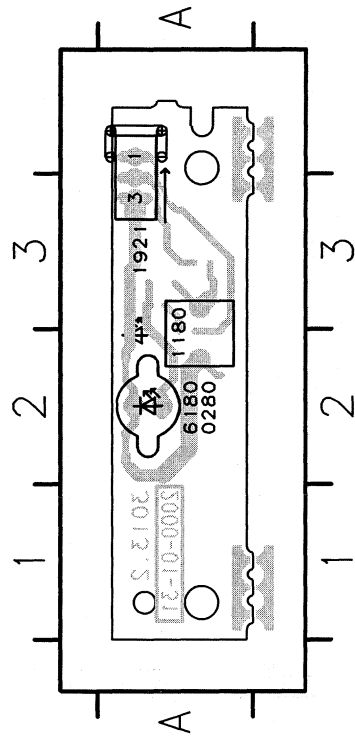


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150502

3180 A1
3181 A1
3182 A2



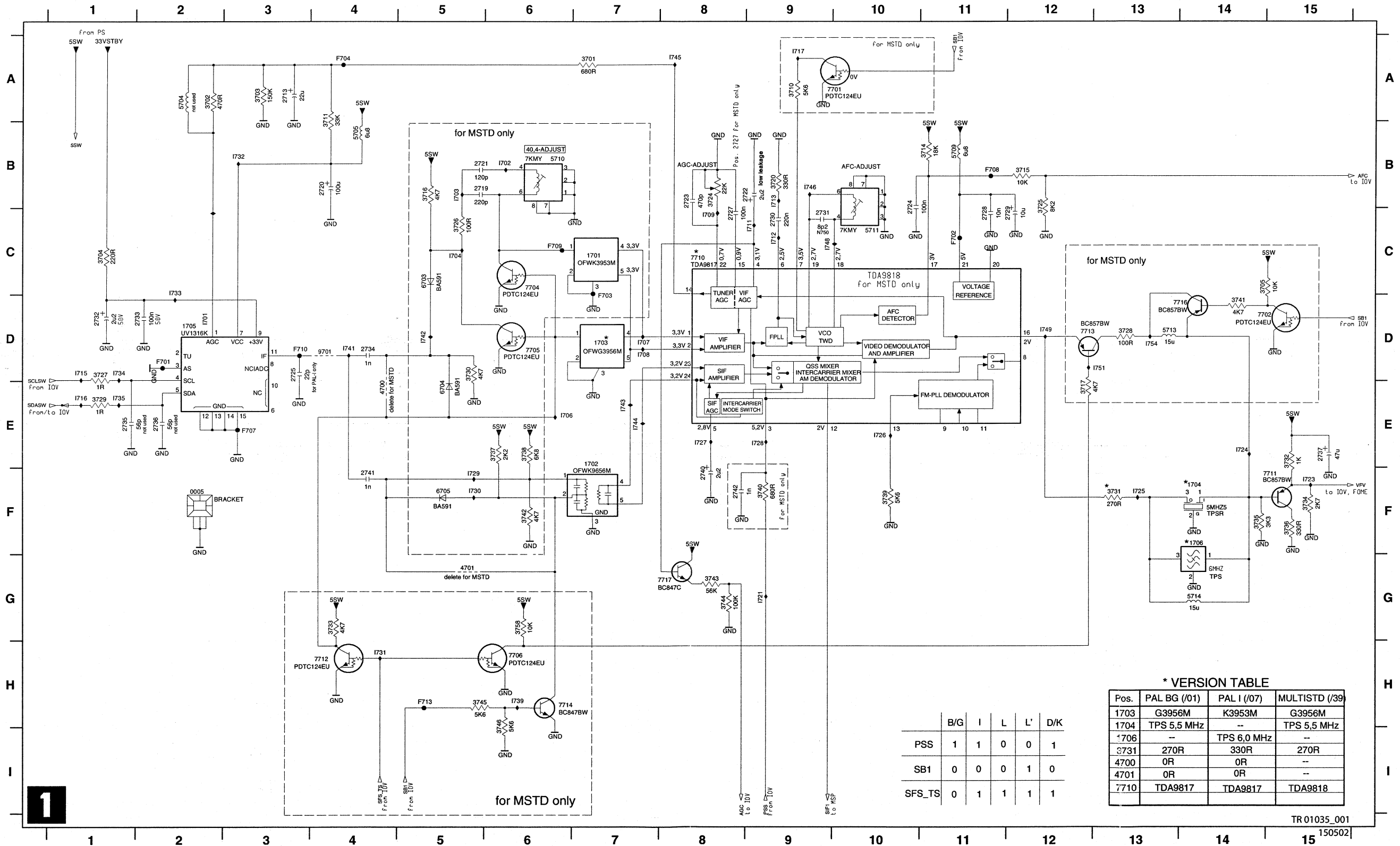
0280 A2
1180 A3
1921 A3
6180 A2



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150502

Analog Board: Fronted Video (FV)

0005 F2 1704 F14 2719 B5 2723 B8 2728 C11 2732 D1 2736 E2 2742 F8 3704 C1 3714 B11 3720 B9 3727 D1 3731 F13 3735 F14 3739 F10 3743 G8 3758 G6 5705 B4 5713 D13 6705 F5 7705 D6 7712 H4 7717 G7 7703 D7 7709 C6 1702 B6 1707 D7 1712 C9 1717 A9 1725 F13 1729 F5 1733 C2 1741 D4 1745 A8 1751 D13
1701 C7 1705 D2 2720 B4 2724 B10 2729 C12 2733 D2 2737 E15 3701 A7 3705 C14 3715 B12 3724 B8 3728 D13 3732 E15 3736 F15 3740 F9 3744 G8 4700 E4 5709 B11 5714 G14 7701 A10 7706 H6 7713 D12 7701 D4 7704 A4 7710 D3 1703 B5 1708 D7 1713 B9 1721 G9 1726 E10 1730 F5 1734 D1 1742 D5 1746 B9 1754 D13
1702 E7 1706 F14 2721 B5 2725 D3 2730 C9 2734 D4 2740 F8 3702 A2 3710 A9 3716 B5 3725 B12 3729 E1 3733 G4 3737 E6 3741 D14 3745 H5 4701 G5 5710 B6 6703 C5 7702 D15 7710 C8 7714 H6 7701 D2 7707 E3 7715 D1 1704 C5 1709 C8 1715 D1 1723 F15 1727 E8 1731 H4 1735 E1 1743 E7 1748 C9
1703 D7 2713 A3 2722 B9 2727 C8 2731 C9 2735 E1 2741 F4 3703 A3 3711 A4 3717 E12 3726 C5 3730 D5 3734 F15 3738 E6 3742 F6 3746 H6 5704 A2 5711 C10 6704 E5 7704 C6 7711 F14 7716 D14 7702 C11 7708 B11 1701 D2 1706 E6 1711 C9 1716 E1 1724 E14 1728 E9 1732 B3 1739 H6 1744 E7 1749 D12

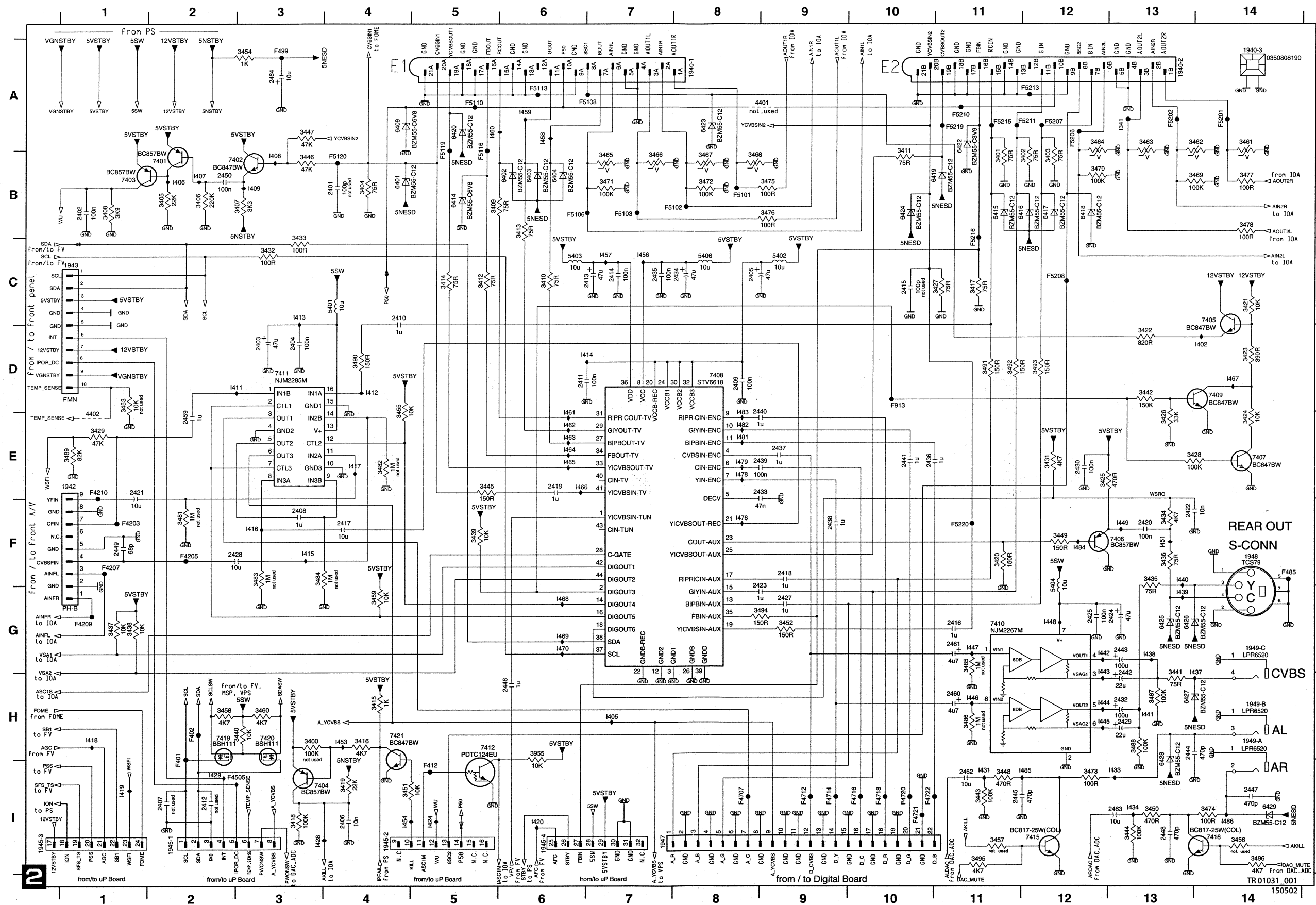


* VERSION TABLE			
Pos.	PAL BG (/01)	PAL I (/07)	MULTISTD (/39)
1703	G3956M	K3953M	G3956M
1704	TPS 5.5 MHz	--	TPS 5.5 MHz
1706	--	TPS 6.0 MHz	--
3731	270R	330R	270R
4701	0R	0R	--
7710	TDA9817	TDA9817	TDA9818

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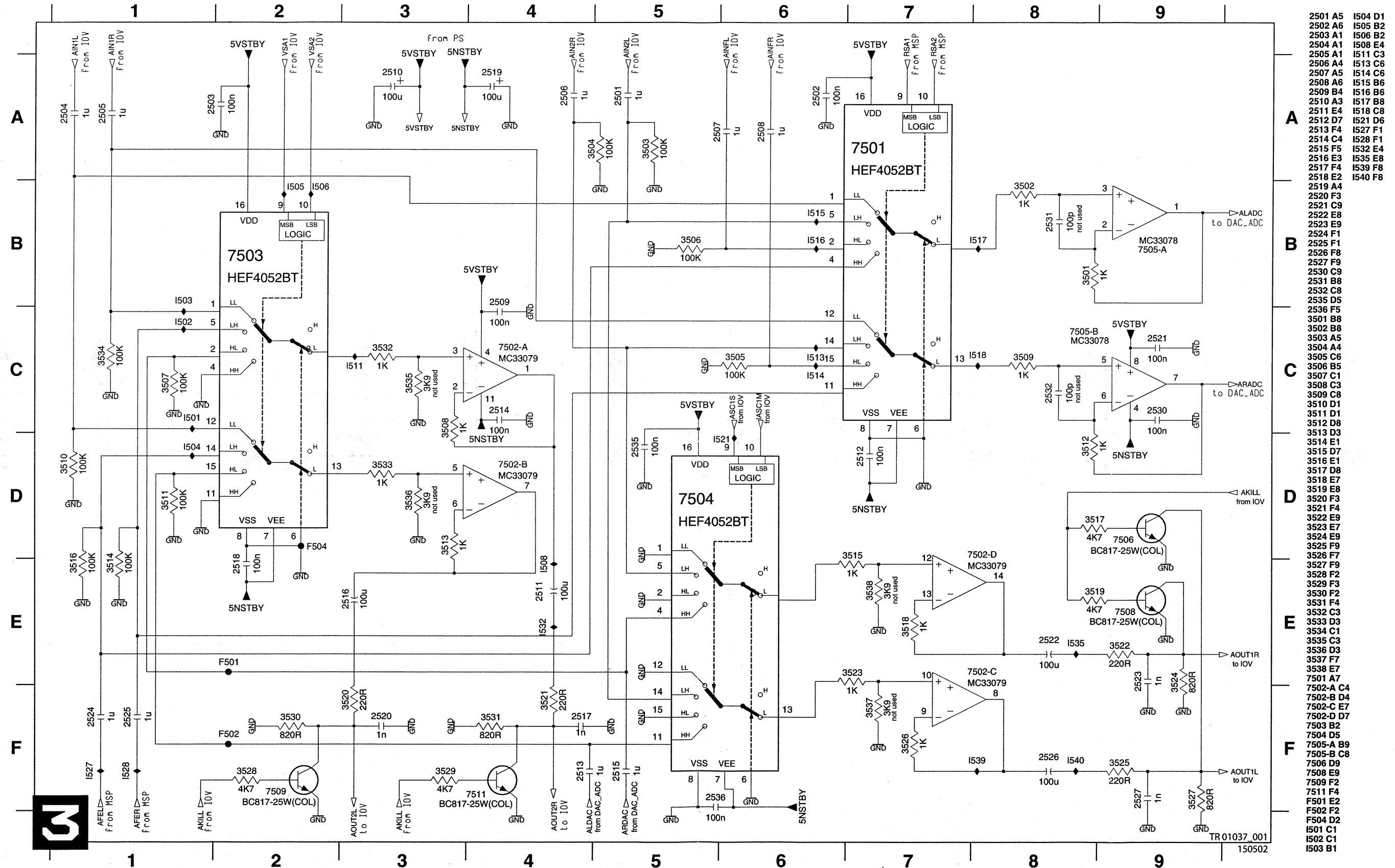
150502

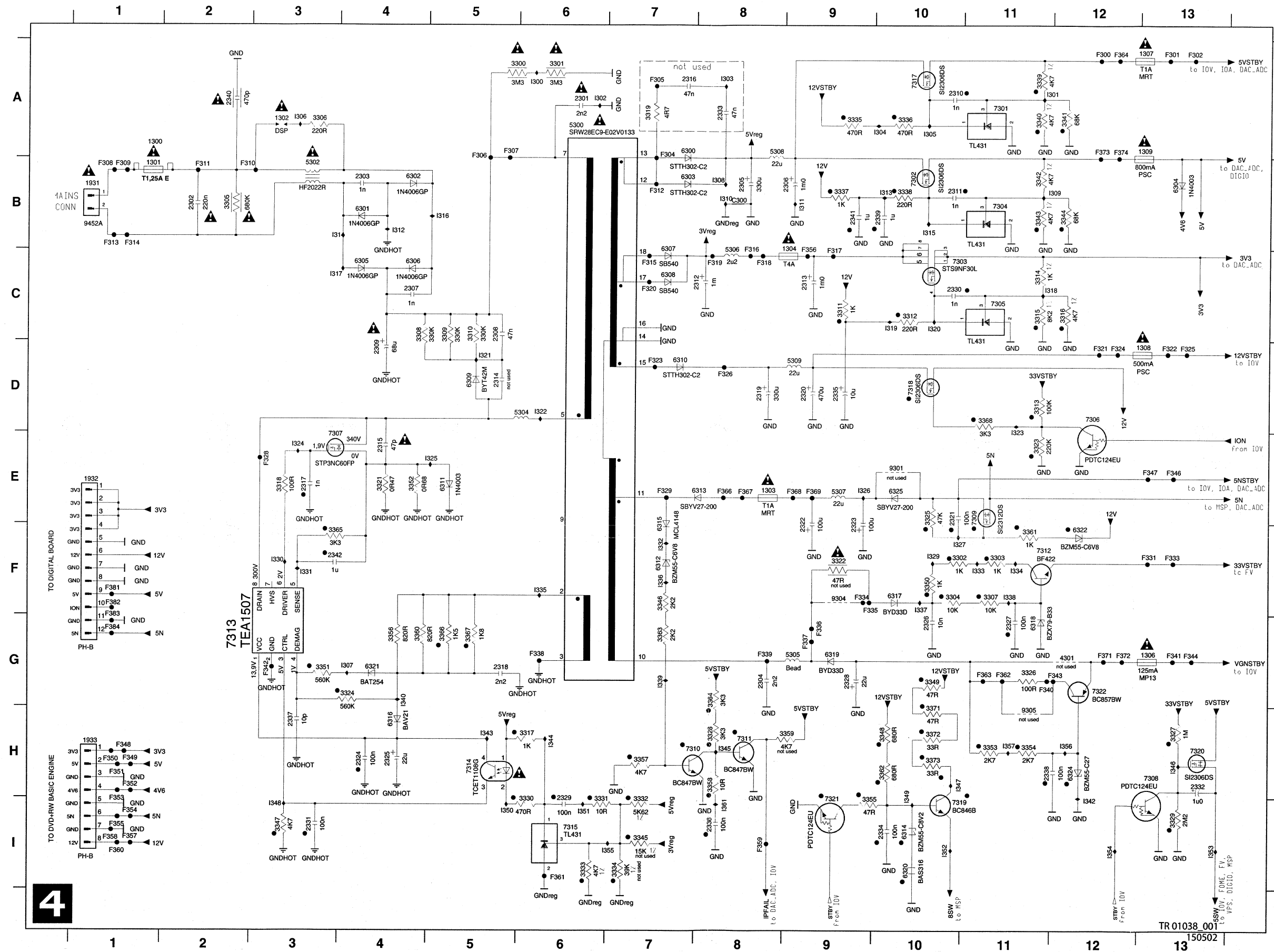
Analog Board: In/Out Video (IOV)



1940-1A0	6417 B12
1940-2A15	6418 B12
1940-3A10	6419 B11
1942 E1	6420 A5
1942 G1	6421 B12
1945-1S12	6423 A8
1947 F7	6424 B10
1948-1A10	6425 G13
1948-1A14	6426 G13
1948-1A15	6427 G13
1948-1C14	6428 B13
1948-1D10	6429 B12
2402 B21	7601 B2
2403 D3	7602 B4
2403 E1	7603 B1
2405 C8	7604 C10
2406 D1	7605 C13
2407 D2	7606 F13
2408 D8	7607 D11
2410 C4	7608 D8
2412 C2	7609 D10
2412 G12	7610 D11
2413 C12	7611 G13
2414 C7	7612 F17
2414 C7	7615 S12
2415 G12	7616 F17
2416 G11	7617 H12
2617 F4	7620 H1
2618 G1	7621 B11
2619 B6	7602 H1
2621 E1	7612 B1
2621 G1	7613 F12
2622 G12	7614 F12
2622 G12	7620 F25
2622 G12	7621 F12
2622 G12	7620 G11
2622 G12	7620 H1
2622 H13	7620 H8
2623 H13	7621 H12
2623 H13	7621 H13
2623 H13	7621 H14
2623 H13	7621 H15
2623 H13	7621 H16
2623 H13	7621 H17
2623 H13	7621 H18
2623 H13	7621 H19
2623 H13	7621 H20
2623 H13	7621 H21
2623 H13	7621 H22
2623 H13	7621 H23
2623 H13	7621 H24
2623 H13	7621 H25
2623 H13	7621 H26
2623 H13	7621 H27
2623 H13	7621 H28
2623 H13	7621 H29
2623 H13	7621 H30
2623 H13	7621 H31
2623 H13	7621 H32
2623 H13	7621 H33
2623 H13	7621 H34
2623 H13	7621 H35
2623 H13	7621 H36
2623 H13	7621 H37
2623 H13	7621 H38
2623 H13	7621 H39
2623 H13	7621 H40
2623 H13	7621 H41
2623 H13	7621 H42
2623 H13	7621 H43
2623 H13	7621 H44
2623 H13	7621 H45
2623 H13	7621 H46
2623 H13	7621 H47
2623 H13	7621 H48
2623 H13	7621 H49
2623 H13	7621 H50
2623 H13	7621 H51
2623 H13	7621 H52
2623 H13	7621 H53
2623 H13	7621 H54
2623 H13	7621 H55
2623 H13	7621 H56
2623 H13	7621 H57
2623 H13	7621 H58
2623 H13	7621 H59
2623 H13	7621 H60
2623 H13	7621 H61
2623 H13	7621 H62
2623 H13	7621 H63
2623 H13	7621 H64
2623 H13	7621 H65
2623 H13	7621 H66
2623 H13	7621 H67
2623 H13	7621 H68
2623 H13	7621 H69
2623 H13	7621 H70
2623 H13	7621 H71
2623 H13	7621 H72
2623 H13	7621 H73
2623 H13	7621 H74
2623 H13	7621 H75
2623 H13	7621 H76
2623 H13	7621 H77
2623 H13	7621 H78
2623 H13	7621 H79
2623 H13	7621 H80
2623 H13	7621 H81
2623 H13	7621 H82
2623 H13	7621 H83
2623 H13	7621 H84
2623 H13	7621 H85
2623 H13	7621 H86
2623 H13	7621 H87
2623 H13	7621 H88
2623 H13	7621 H89
2623 H13	7621 H90
2623 H13	7621 H91
2623 H13	7621 H92
2623 H13	7621 H93
2623 H13	7621 H94
2623 H13	7621 H95
2623 H13	7621 H96
2623 H13	7621 H97
2623 H13	7621 H98
2623 H13	7621 H99
2623 H13	7621 H100
2623 H13	7621 H101
2623 H13	7621 H102
2623 H13	7621 H103
2623 H13	7621 H104
2623 H13	7621 H105
2623 H13	7621 H106
2623 H13	7621 H107
2623 H13	7621 H108
2623 H13	7621 H109
2623 H13	7621 H110
2623 H13	7621 H111
2623 H13	7621 H112
2623 H13	7621 H113
2623 H13	7621 H114</

Analog Board: IN/Out Audio (IOA)

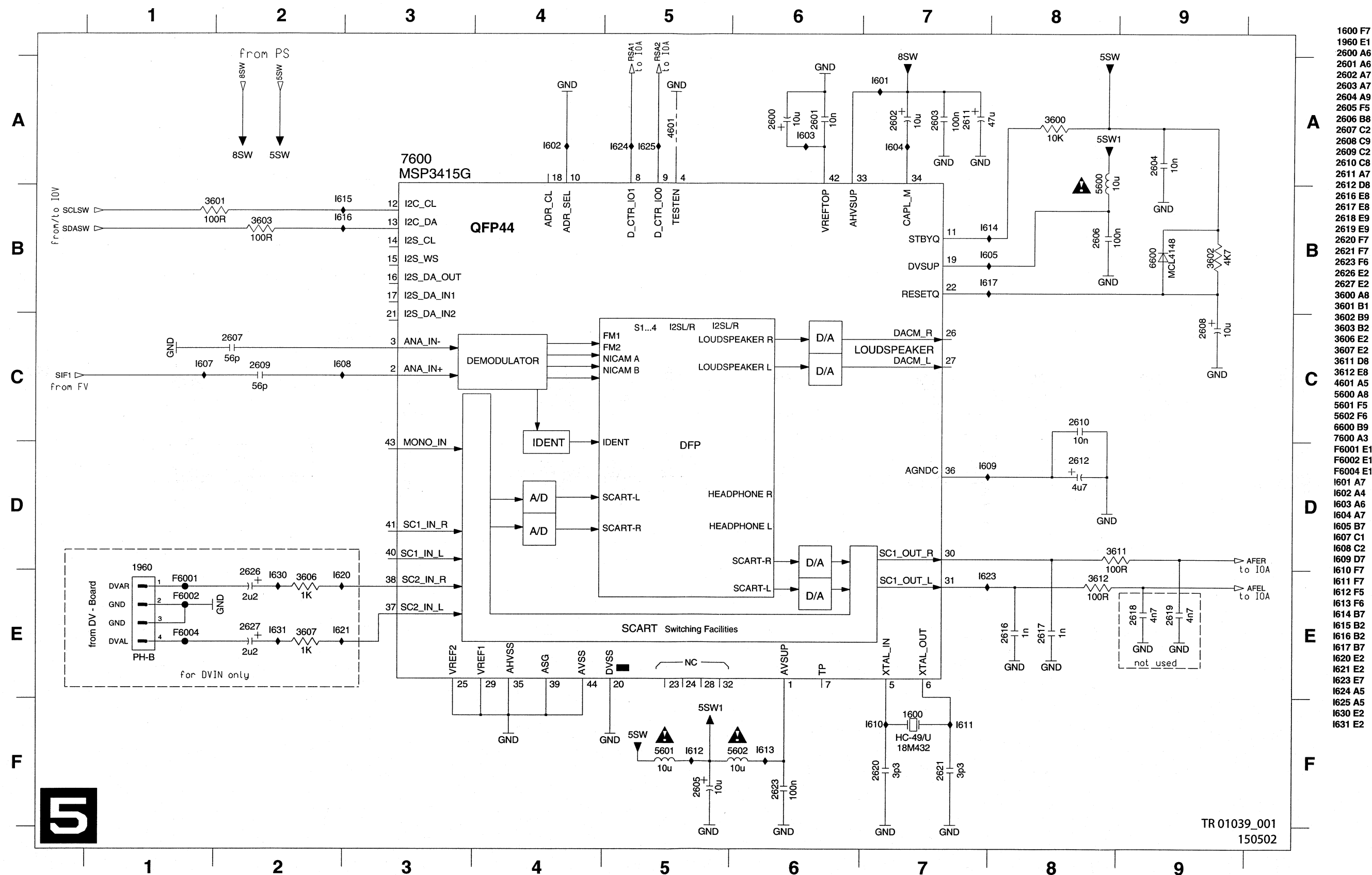


Analog Board: Power Supply (PS)

1300 A1	3365 F3	F357 I1
1301 B1	3366 G5	F358 I1
1302 A3	3367 G5	F359 I8
1303 E8	3368 D11	F360 I1
1304 C9	3371 H10	F361 I6
1306 G13	3372 H10	F362 G11
1307 A13	3373 H10	F363 G11
1308 D13	4301 G12	F364 A12
1309 A13	5300 A6	F366 E8
1931 B1	5302 B3	F367 E8
1932 E1	5304 D6	F368 E9
1933 H1	5305 C9	F369 E9
2301 A6	5306 C8	F371 G12
2302 B2	5307 E9	F372 G12
2303 B4	5308 A8	F373 A12
2304 G8	5309 D9	F374 A12
2305 B8	6300 A7	F381 F1
2306 B9	6301 B4	F382 F1
2307 C4	6302 B4	F383 G1
2308 C5	6303 B7	F384 G1
2309 D4	6304 B13	I300 A6
2310 A10	6305 C4	I301 A11
2311 B10	6306 C4	I302 A6
2312 C8	6307 C7	I303 A8
2313 C9	6308 C7	I304 A10
2314 D5	6309 D5	I305 A10
2315 E4	6310 D7	I306 A3
2316 A7	6311 E5	I307 G4
2317 E3	6312 F7	I308 B8
2318 G5	6313 E8	I309 B12
2319 D8	6314 I10	I310 B8
2320 D9	6315 E7	I311 B9
2321 E10	6316 H4	I312 B4
2322 F9	6317 F10	I313 B10
2323 F9	6318 G11	I314 B3
2324 H4	6319 G9	I315 B10
2325 H4	6320 I10	I316 B5
2326 G10	6321 G4	I317 C3
2327 G11	6322 F12	I318 C11
2328 G9	6324 H12	I319 C10
2329 I6	6325 E10	I320 C10
2330 C10	7301 A11	I321 D5
2331 I3	7302 B10	I322 D6
2332 H13	7303 C10	I323 D11
2333 A8	7304 B11	I324 E3
2334 I10	7305 C11	I325 E5
2335 D9	7306 D12	I326 E9
2336 I8	7307 E3	I327 F10
2337 H3	7308 H13	I329 F10
2338 H11	7309 E11	I330 F3
2339 B10	7310 H7	I331 F3
2340 A2	7311 H8	I332 F7
2341 B9	7312 F11	I333 F11
2342 F3	7313 G2	I334 F11
3300 A5	7314 H5	I335 F6
3301 A6	7315 I6	I336 F7
3302 F10	7317 A10	I337 F10
3303 F11	7318 D10	I338 F11
3304 F10	7319 I10	I339 G7
3305 B2	7320 H13	I340 G4
3306 A3	7321 B9	I342 I12
3307 F11	7322 G12	I343 H5
3308 C4	9301 E10	I344 H6
3309 C5	9304 F9	I345 H8
3310 C5	9305 H11	I346 H13
3311 C9	C300 B8	I347 H10
3312 C10	F300 A12	I348 I3
3313 D11	F301 A13	I349 H10
3314 C11	F302 A13	I350 I5
3315 C11	F304 A7	I351 I6
3316 C12	F305 A7	I352 I10
3317 H6	F306 B5	I353 I13
3318 E3	F307 A5	I354 I12
3319 A7	F308 B1	I355 I7
3321 E4	F309 B1	I356 H12
3322 F9	F310 B2	I357 H11
3323 E11	F311 B2	I361 I8
3324 G4	F312 B7	
3325 E10	F313 B1	
3326 G11	F314 B1	
3327 H13	F315 C7	
3328 H8	F316 C8	
3329 I13	F317 C9	
3330 I6	F318 C8	
3331 I6	F319 C8	
3332 I7	F320 C7	
3333 I6	F321 D12	
3334 I7	F322 D13	
3335 A9	F323 D7	
3336 A10	F324 D12	
3337 B9	F325 D13	
3338 B10	F326 D8	
3339 A11	F328 E3	
3340 A11	F329 E7	
3341 A12	F331 F13	
3342 B11	F333 F13	
3343 B11	F334 F9	
3344 B12	F335 F9	
3345 I7	F336 G9	
3346 F7	F337 G9	
3347 I3	F338 G9	
3348 H10	F339 G8	
3349 G10	F340 G11	
3350 F10	F341 G13	
3351 G3	F342 G3	
3352 E4	F343 G12	
3353 H11	F344 G13	
3354 H11	F345 E13	
3355 I9	F347 E13	
3356 G4	F348 H1	
3357 H7	F349 H1	
3358 H8	F350 H1	
3359 H9	F351 H1	
3360 G4	F352 H1	
3361 F11	F353 I1	
3362 H10	F354 I1	
3363 G7	F355 I1	
3364 G8	F356 C9	

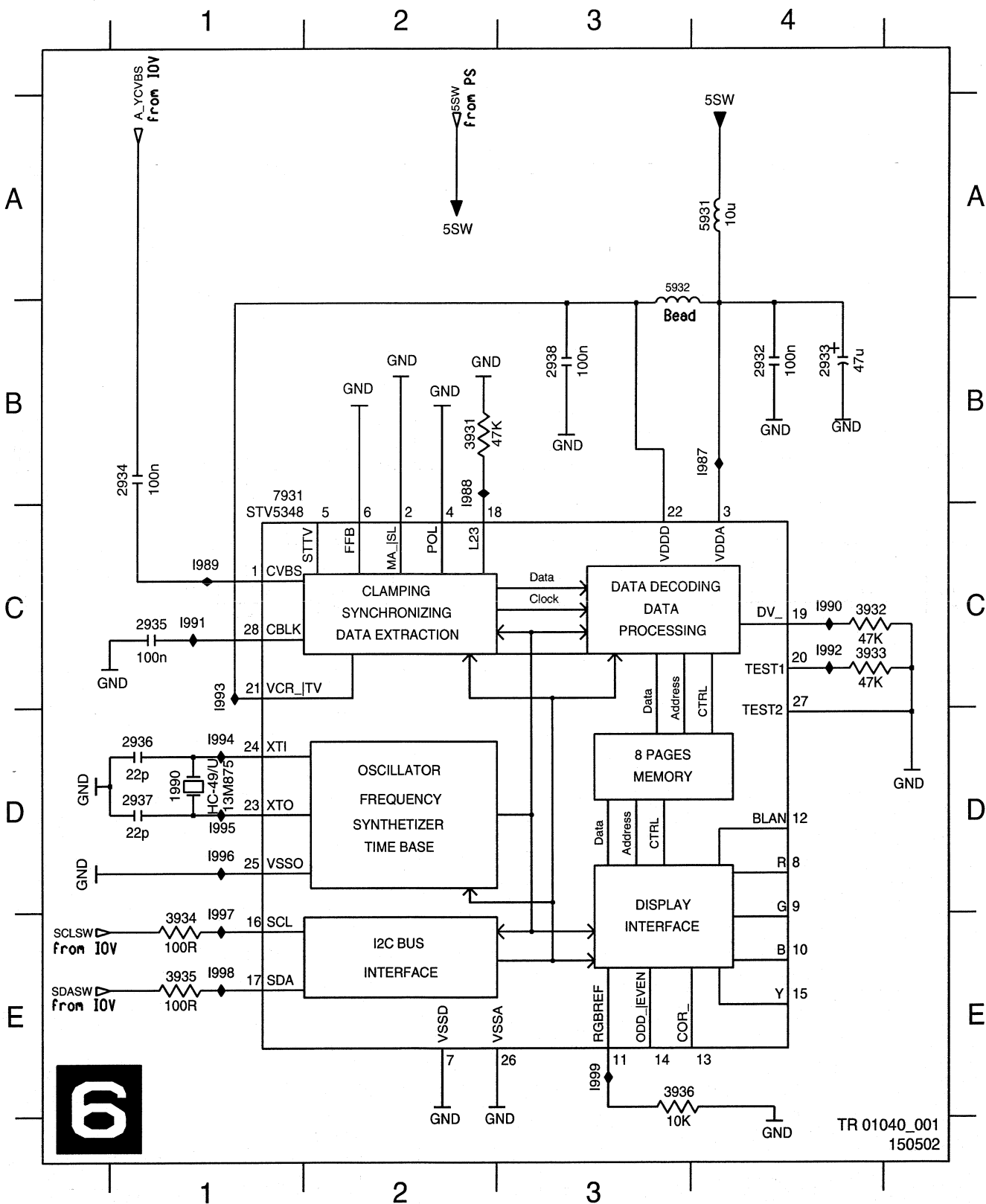
TR 01038_001

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Analog Board: Multi Sound Processing (MSP)

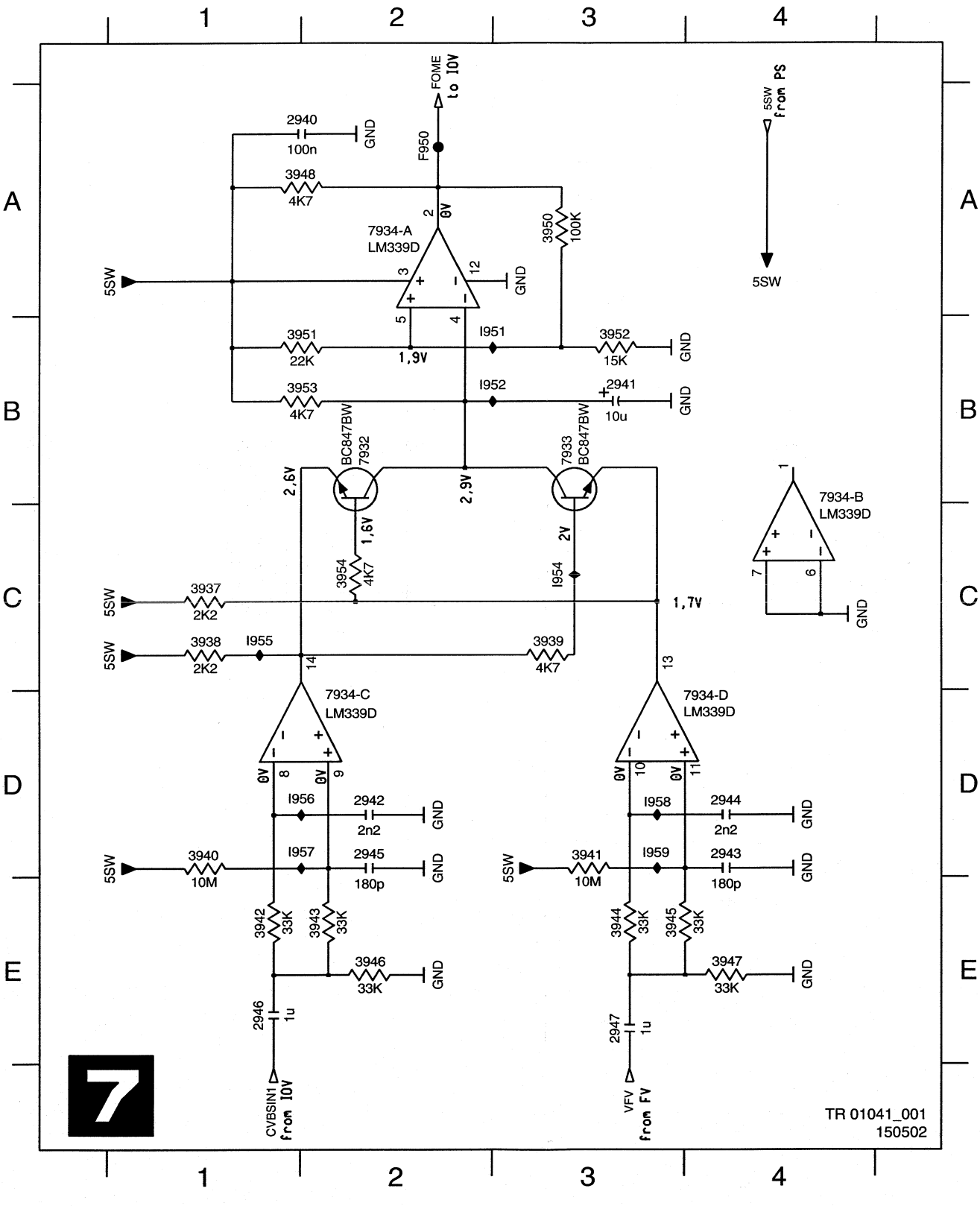
Analog Board: VPS (VPS)

1990 D1 2934 B1 2937 D1 3932 C4 3935 E1 5932 A3 1988 B2 1991 C1 1994 D1 1997 E1
2932 B4 2935 C1 2938 B3 3933 C4 3936 E3 7931 B2 1989 C1 1992 C4 1995 D1 1998 E1
2933 B4 2936 D1 3931 B2 3934 E1 5931 A4 1987 B4 1990 C4 1993 C1 1996 D1 1999 E3



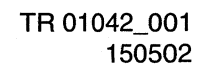
Analog Board: Follow Me (FOME)

2940 A2 2944 D4 3937 C1 3941 D3 3945 E3 3950 A3 7934-B B4 1951 B3 1956 D2
2941 B3 2945 D2 3938 C1 3942 E1 3946 E2 3951 B2 7934-C C2 1952 B3 1957 D2
2942 D2 2946 E1 3939 C3 3943 E2 3947 E4 3952 B3 7934-D D3 1953 C3 1958 D3
2943 D4 2947 E3 3940 D1 3944 E3 3948 A1 3953 B2 7934-A A2 F950 A2 1955 C1 1959 D3

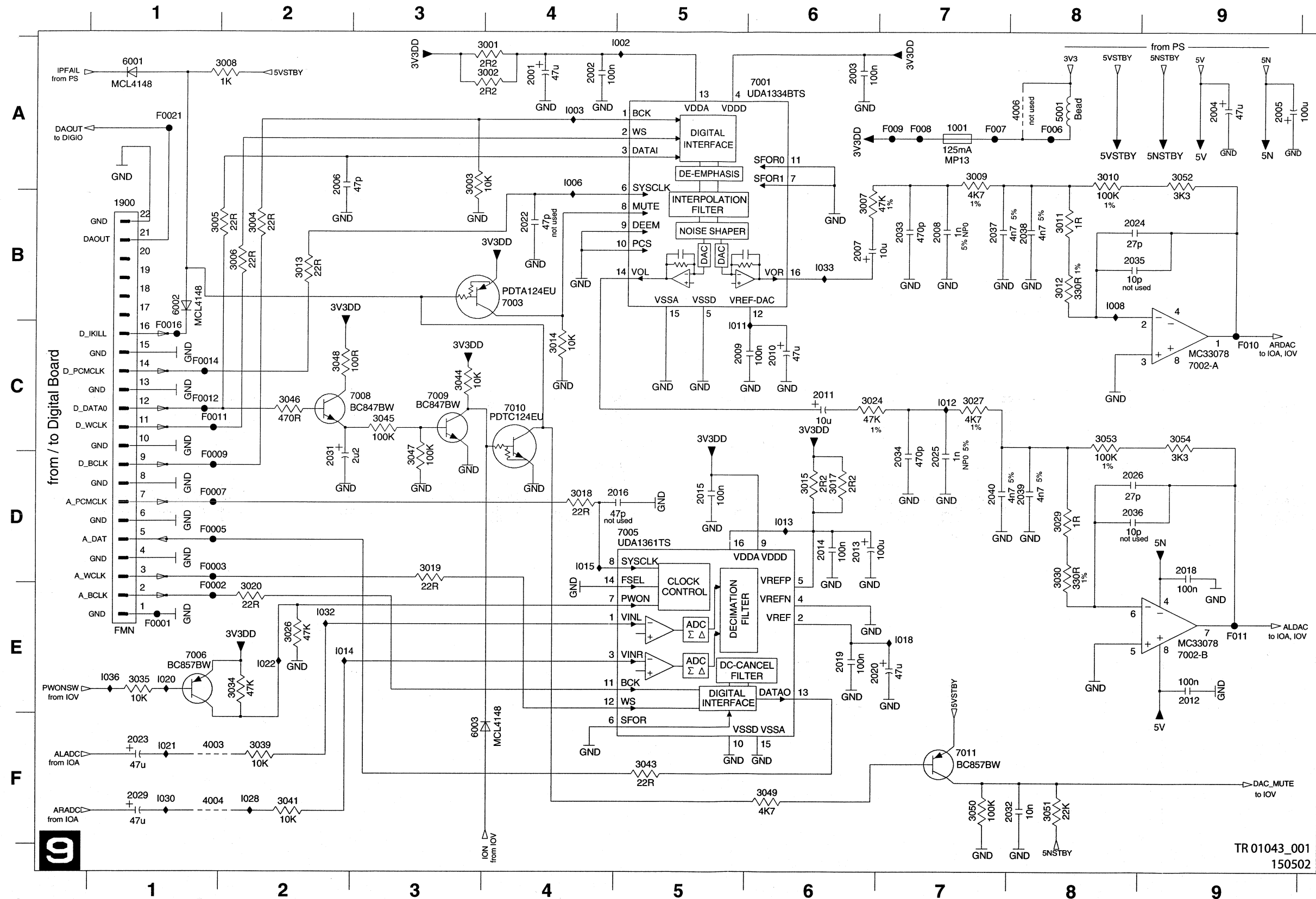


Analog Board: Digital In/Out (DIGIO)

1951 A4	2585 C3	2590 A3	3582 D2	5580 B2	7580-A C2	7580-D D3	F4102 A4	I488 C2	I491 D2
2580 A3	2586 D3	3580 A3	3584 C1	5581 A1	7580-B C3	7580-E D3	F4103 A4	I489 C3	I492 D3
2581 A1	2587 E2	3581 C2	3585 D3	6580 C4	7580-C C3	7580-F D3	I487 A3	I490 C1	I493 B4



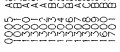
Analog Board: Audio Converter(DAC_ADC)



1001 A7	4003 F1
1900 B1	4004 F1
2001 A4	4006 A8
2002 A4	5001 A8
2003 A6	6001 A1
2004 A9	6002 B1
2005 A9	6003 F3
2006 A2	7001 A6
2007 B6	7002-A C9
2008 B7	7002-B E9
2009 C5	7003 B4
2010 C6	7005 D5
2011 C6	7006 E1
2012 E9	7008 C2
2013 D6	7009 C3
2014 D6	7010 C4
2015 D5	7011 F6
2016 D5	F0001 E1
2018 D9	F0002 E1
2019 E6	F0003 D1
2020 E7	F0005 D1
2022 B4	F0007 D1
2023 F1	F0009 D1
2024 B8	F0011 C1
2025 D7	F0012 C1
2026 D8	F0014 C1
2029 F1	F0016 C1
2031 D2	F0021 A1
2032 F7	F006 A8
2033 B7	F007 A7
2034 D7	F008 A7
2035 B8	F009 A7
2036 D8	F010 C9
2037 B7	F011 E9
2038 B8	I002 A5
2039 D8	I003 A4
2040 D7	I006 A4
3001 A4	I008 B8
3002 A4	I011 C5
3003 A3	I012 C7
3004 B2	I013 D6
3005 B1	I014 E2
3006 B2	I015 D4
3007 B6	I018 E7
3008 A2	I020 E1
3009 A7	I021 F1
3010 A8	I022 E2
3011 B8	I028 F2
3012 B8	I030 F1
3013 B2	I032 E2
3014 C4	I033 B6
3015 D6	I036 E1
3017 D6	
3018 D4	
3019 D3	
3020 E2	
3024 C6	
3026 E2	
3027 C7	
3029 D8	
3030 D8	
3034 E2	
3035 E1	
3039 F2	
3041 F2	
3043 F5	
3044 C3	
3045 C3	
3046 C2	
3047 D3	
3048 C2	
3049 F6	
3050 F7	
3051 F7	
3052 A9	
3053 C8	
3054 C9	

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Layout Analog Board (Top View)



Layout Analog Board (Overview Bottom View)

1. 本図は、DVDR880-890 (0X1) のアナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

2. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

3. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

4. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

5. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

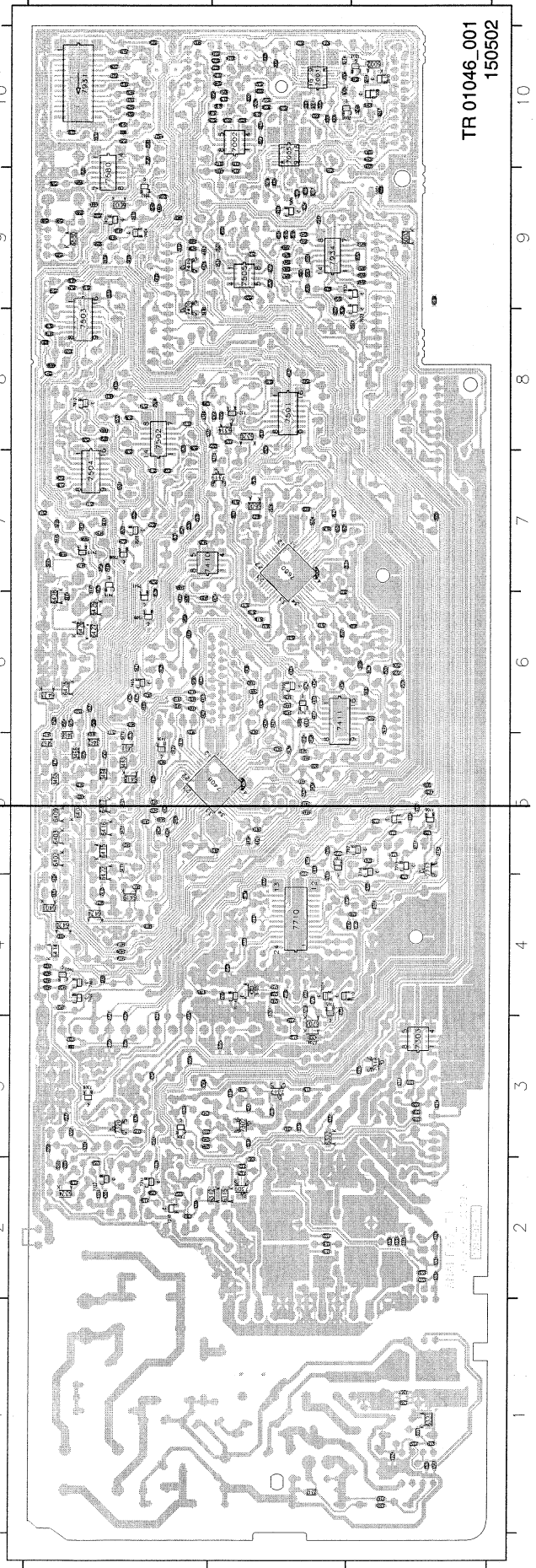
6. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

7. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

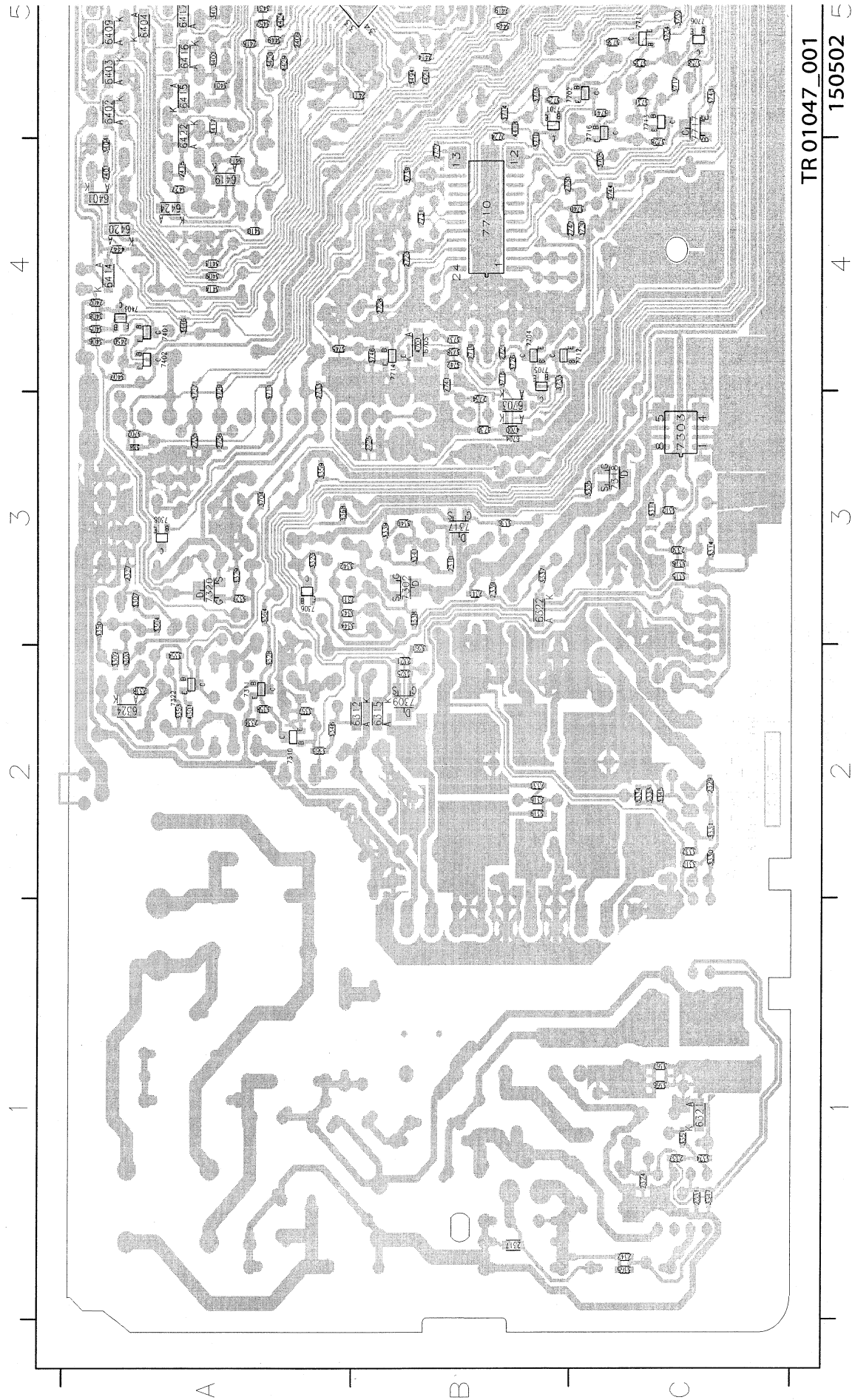
8. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

9. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。

10. 本図は、アナログボードの底面レイアウトを示す。図中の各部品は、部品番号と実寸法で示されている。また、各部品の位置関係も示されている。



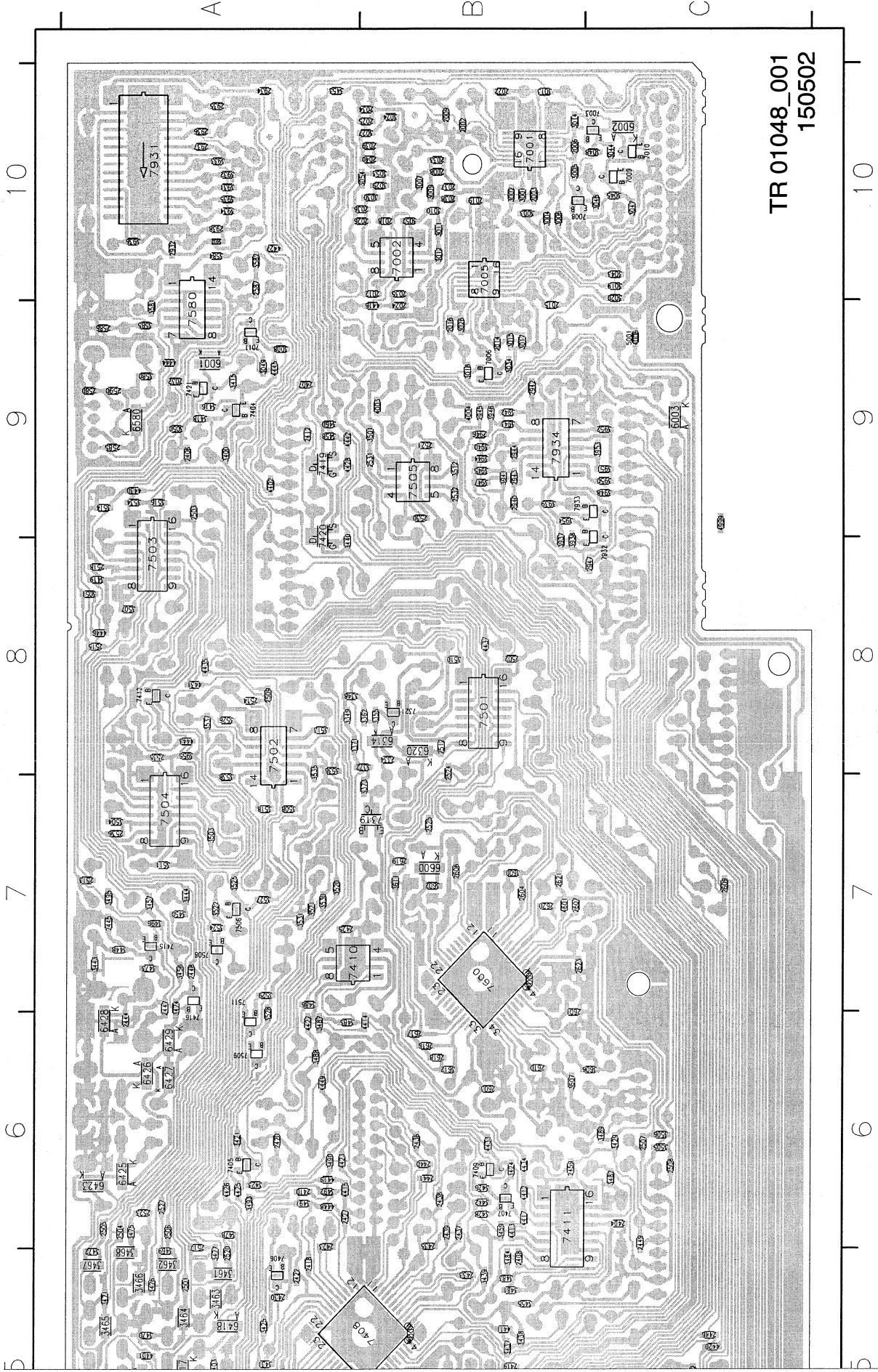
Layout Analog Board (Part 1 Bottom View)



TR01047_001

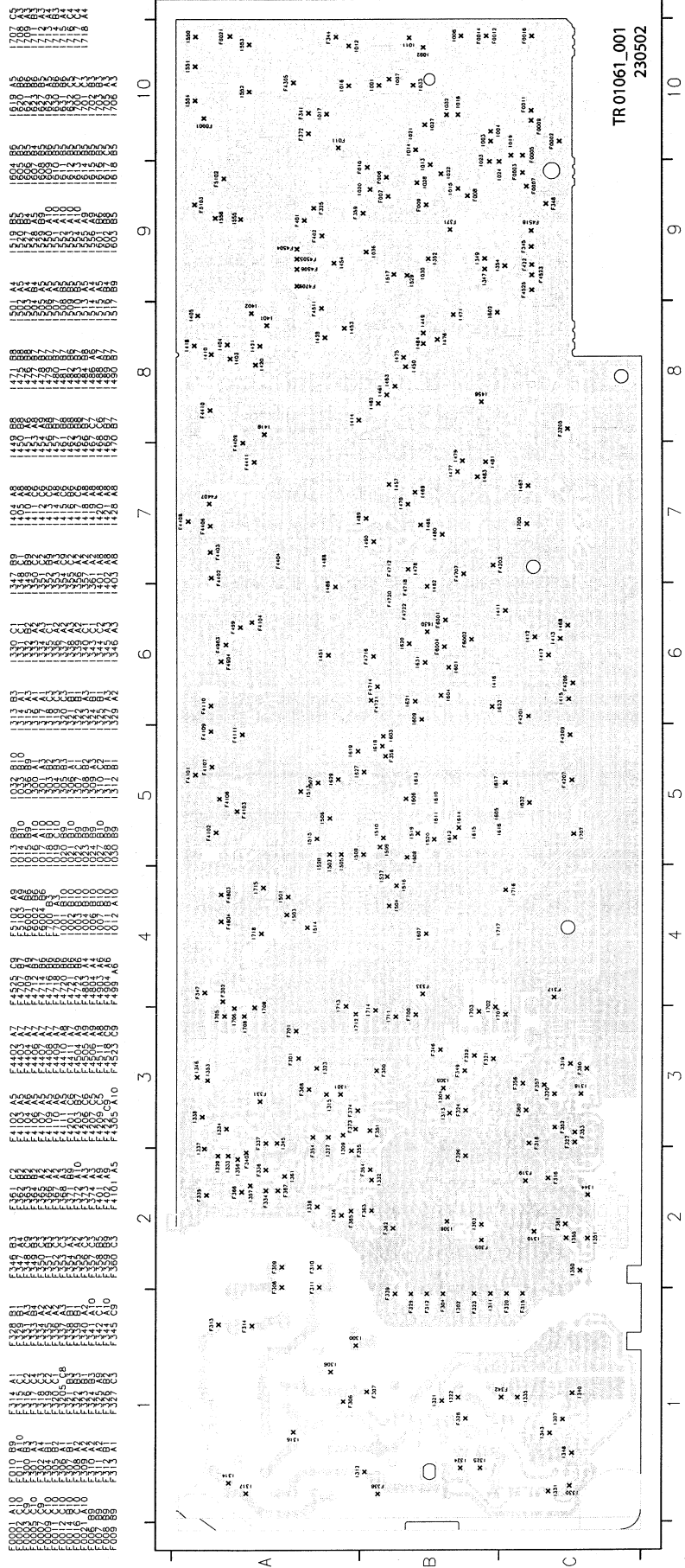
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Layout Analog Board (Part 2 Bottom View)



TR 01048_001
150502

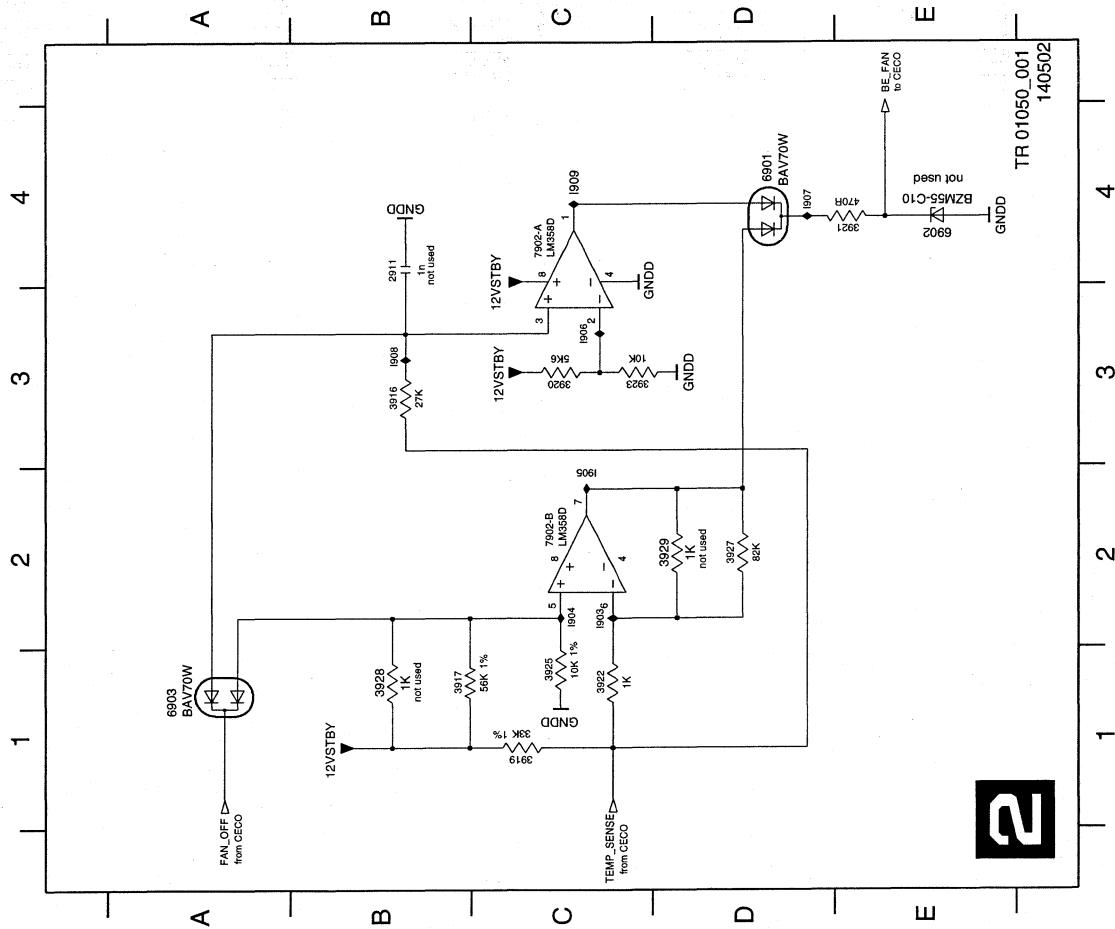
Test points overview Analog Board



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UPC12 Sub PCB: Fan Control (FACO)

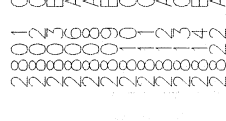
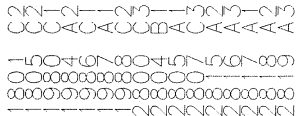
2911 B4 3919 C1 3922 C1 3927 D2 6901 D4 7902-A C4 1904 C2 1907 D4
3916 B3 3920 C3 3923 C3 3928 B1 6902 E4 7902-B C2 1905 C2 1906 B3
3917 B1 3921 E4 3925 C1 3929 D2 6903 A1 1903 C3 1909 C4



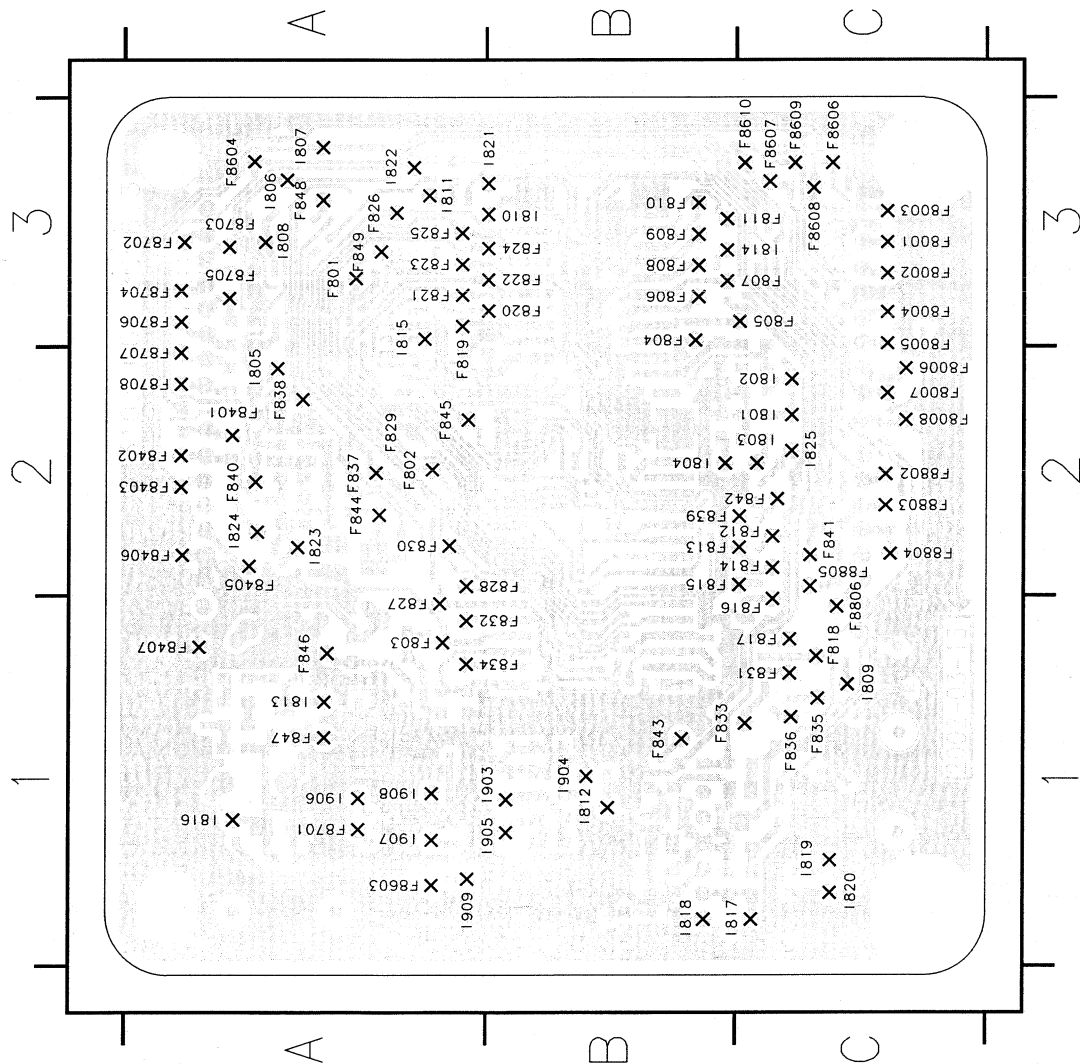
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Layout UPC 12 Sub PCB (Bottom View)

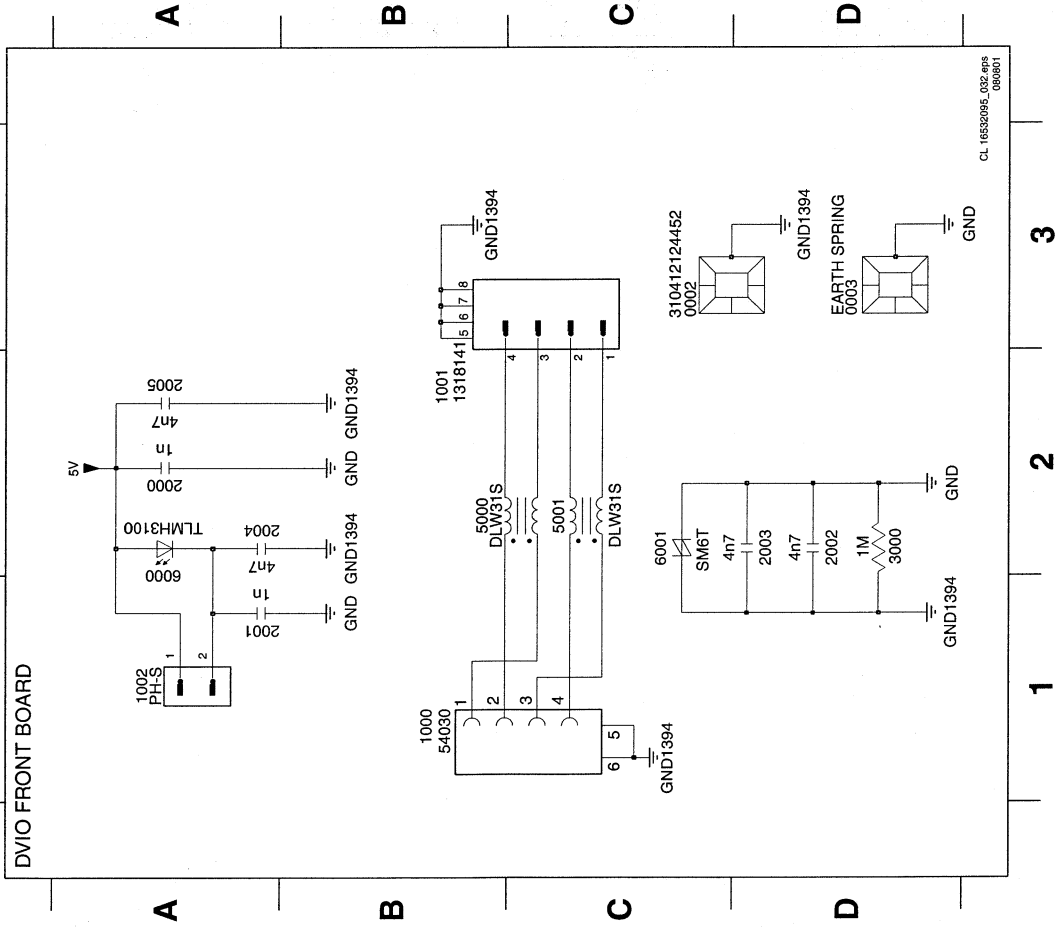


Tests points overview UPC12 Sub PCB



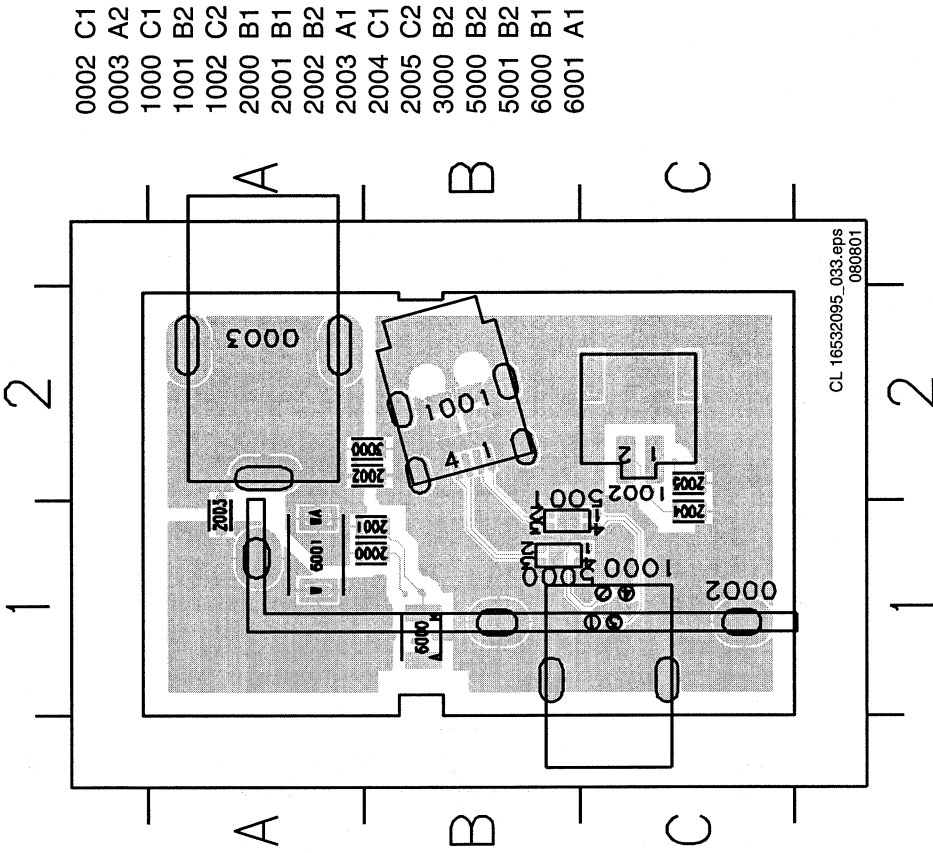
DVIO Front Board

0002 C3 1000 B1 1002 A1 2001 A1 2003 D2 5000 B2 6000 A2
0003 D3 1001 B2 2000 A2 2002 D2 3000 D2 5001 C2 6001 C2



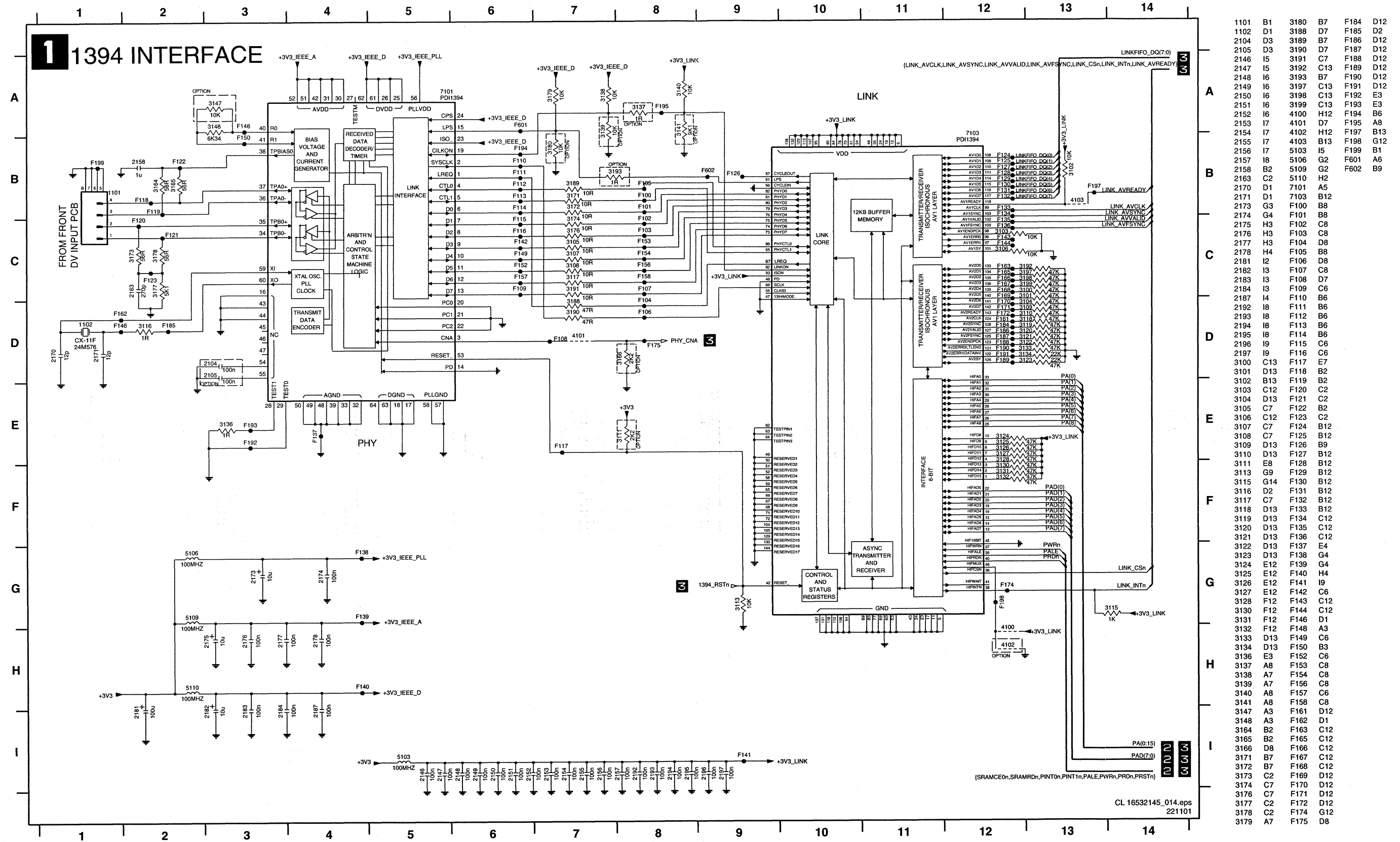
CL 16532095_032.aps
080801

Layout DVIO Front Board



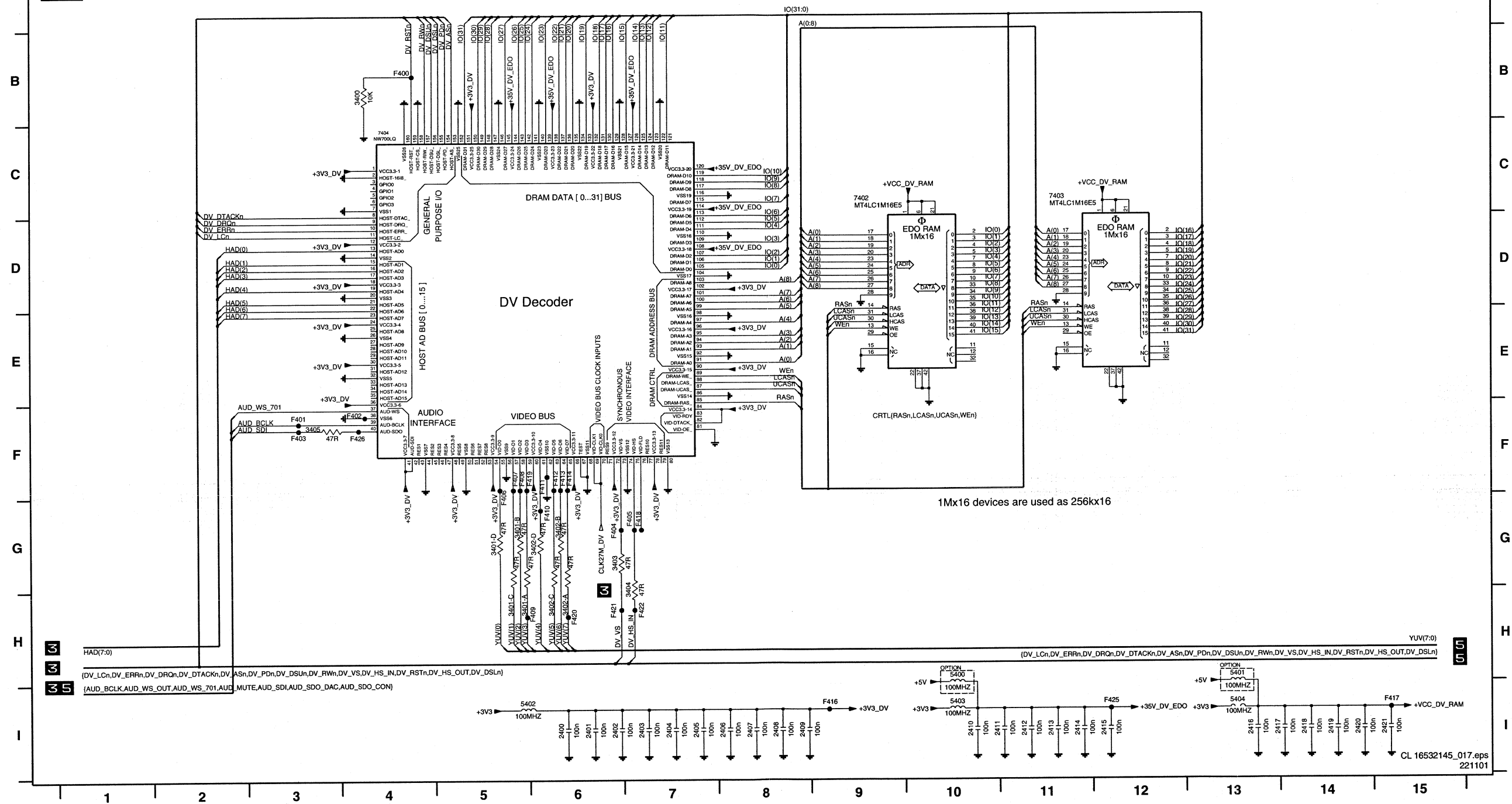
CL 16532095_033.aps
080801

DVIO Board: 1394 Interface

CL 16532145_014.eps
221101

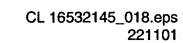
DVIO Board: DVCODEC

4 DVCODEC

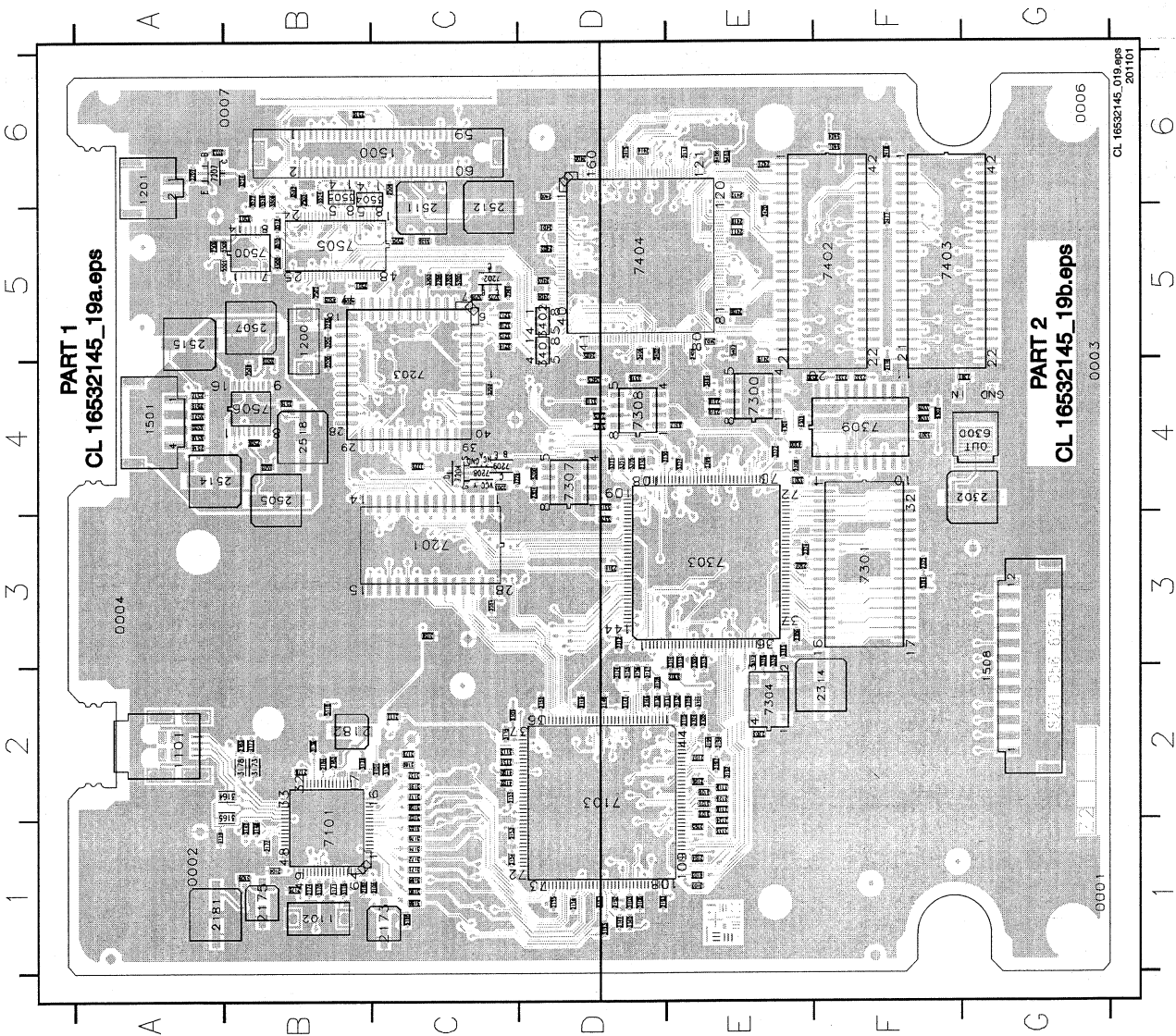


2400 I6
2401 I6
2402 I6
2403 I7
2404 I7
2405 I7
2406 I8
2407 I8
2408 I8
2409 I8
2410 I10
2411 I10
2412 I11
2413 I11
2414 I11
2415 I12
2416 I13
2417 I13
2418 I14
2419 I14
2420 I14
2421 I15
3400 B4
3401-A H5
3401-B G5
3401-C H5
3401-D G5
3402-A H6
3402-B G6
3402-C H6
3402-D G6
3403 G6
3404 G7
3405 F3
5400 H10
5401 H13
5402 I5
5403 I10
5404 I13
7402 C9
7403 C11
7404 C4
F400 B4
F401 F3
F402 F4
F403 F3
F404 G6
F405 G7
F406 F5
F407 F5
F408 F5
F409 H6
F410 G6
F411 F6
F412 F6
F413 F6
F414 F6
F416 I9
F417 I15
F418 G7
F419 F6
F420 H6
F421 H6
F422 H7
F425 I12
F426 F4

5 AUDIO & VIDEO OUTPUT



Layout DVIO Board (Overview Top View)



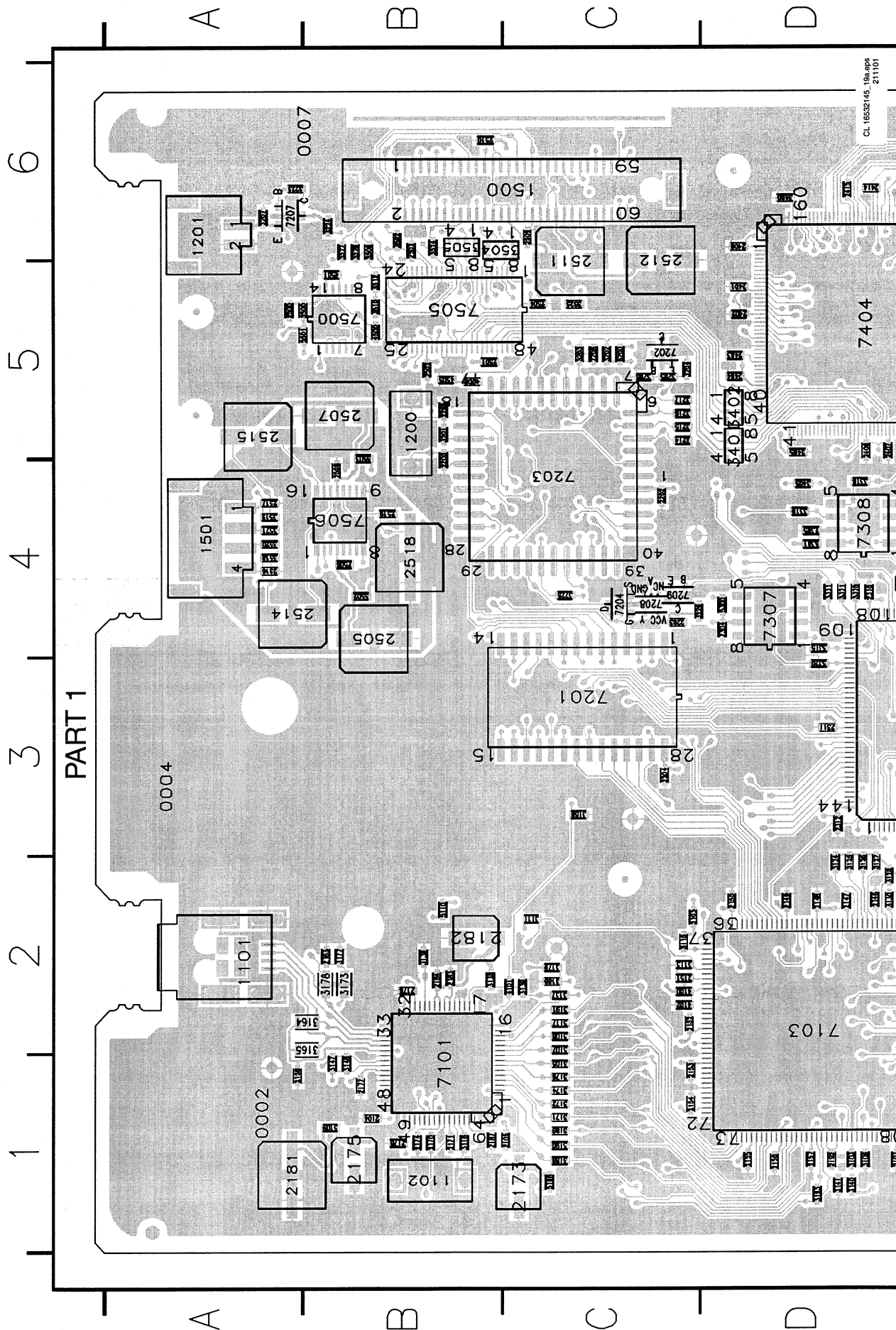
7403 F6
7404 D5
7500 B5
7505 B5
7508 B4

3331 D4
3400 D6
3401 D5
3402 D5
3403 E5
3404 E4
3405 D4
3602 B6
3604 B6
3605 B6
3606 B6
3610 B5
3612 B5
3618 A4
3619 A4
3620 A4
3621 A4
3624 B6
3625 C5
3626 B6
3627 B6
4100 C2
4101 C2
4102 C2
4103 E1
4208 B5
4300 E4
4301 E4
4302 E4
4500 B5
4501 B5
4505 B5
5103 C2
5108 C1
5109 B1
5110 B2
5200 C5
5201 D4
5300 D4
5301 D4
5302 E2
5303 F4
5304 F3
5400 E6
5401 F6
5402 E5
5403 E8
5404 F8
5500 A5
5501 A5
5502 B4
5503 B4
6300 G4
7101 B1
7103 D2
7201 C3
7202 C5
7203 C4
7204 C4
7207 A6
7208 C4
7209 C4
7300 E4
7301 F3
7303 E3
7304 E2
7307 D4
7308 D4
7309 F4
7402 F5

2332 F4
2400 D6
2401 D5
2402 D5
2403 D5
2404 D5
2405 D5
2406 D5
2407 D5
2408 E5
2409 E5
2410 E5
2411 E5
2412 E5
2413 E5
2414 D6
2415 D6
2416 F4
2417 F5
2418 F8
2419 E4
2420 E5
2421 E5
2500 A5
2501 B5
2502 B5
2503 B6
2504 C5
2505 B4
2506 B4
2507 B5
2508 B4
2509 C6
2510 B6
2511 C5
2512 C5
2514 A4
2515 A5
2516 A4
2517 A4
2518 B4
2519 B4
3100 E2
3101 E2
3102 E1
3103 D1
3104 E2
3105 C1
3106 D1
3107 C2
3108 C2
3109 E2
3110 E2
3111 C2
3112 C2
3113 E3
3114 E3
3115 D4
3116 B1
3117 E2
3118 E2
3119 E2
3120 E2
3121 E2
3122 E2
3123 E2
3124 D2
3125 D2
3126 D2
3127 D2
3128 D2

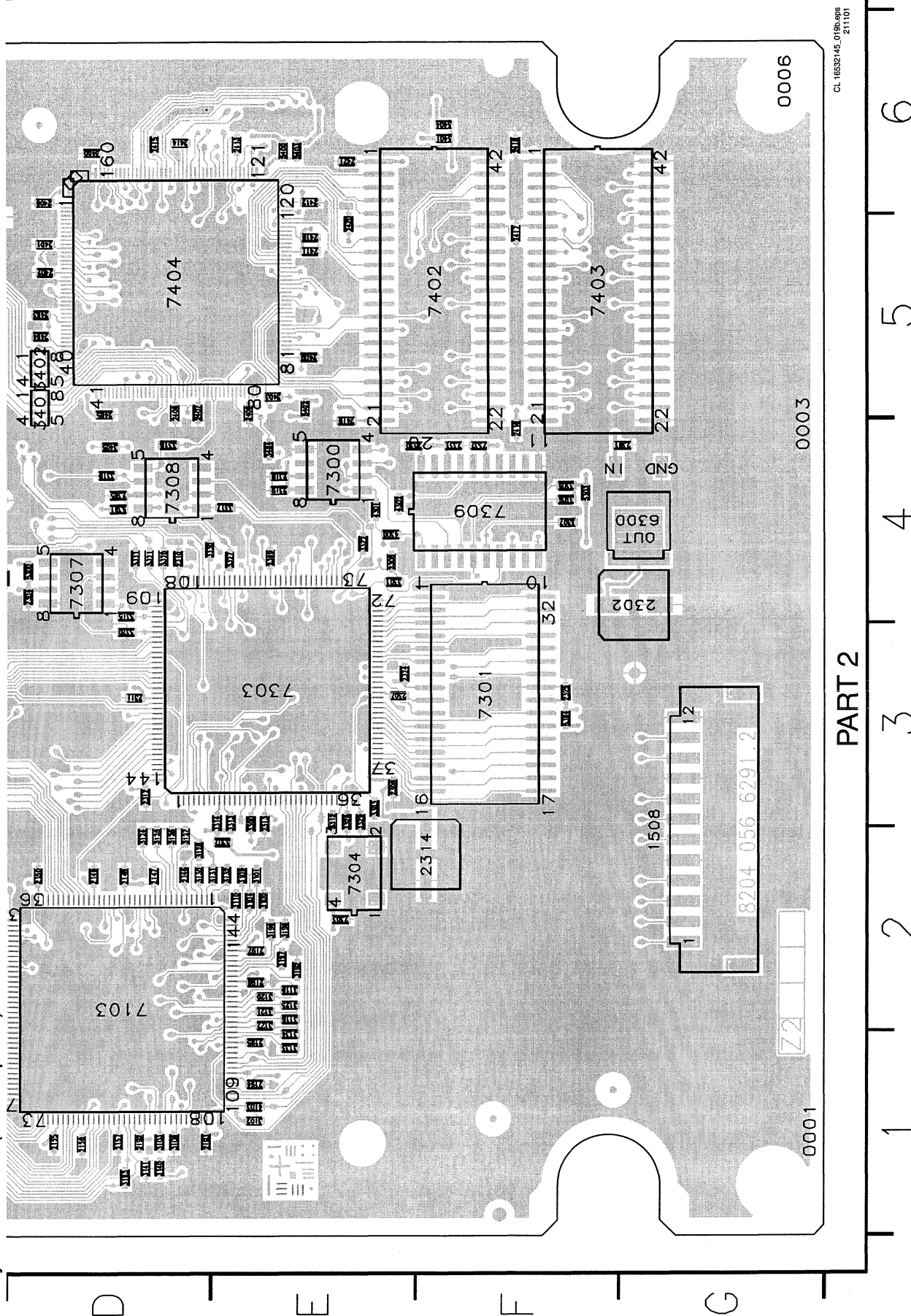
1101 A2
1102 B1
1200 B5
1201 A6
1500 C6
1501 A4
1508 G2
2104 B1
2105 C1
2146 D2
2147 D2
2148 D2
2149 D2
2150 D2
2151 C2
2152 C2
2153 C1
2154 C1
2155 D1
2156 D1
2157 D1
2158 A1
2163 B2
2170 B1
2171 B1
2173 C1
2174 B1
2175 B1
2176 B1
2177 B1
2178 B2
2181 A1
2182 B2
2183 B2
2184 B2
2187 B1
2192 D1
2193 D1
2194 E1
2195 E1
2196 E2
2200 B4
2202 C4
2203 C4
2204 C3
2205 B5
2206 C5
2207 A6
2301 G4
2302 G4
2303 E2
2304 D4
2305 D4
2306 E3
2307 E3
2308 E4
2309 E4
2310 D4
2311 D3
2312 D3
2313 E3
2314 F2
2316 E4
2318 E4
2324 F3
2325 F3
2330 E4
2331 F4

Layout DVIO Board (Part 1 Top View)

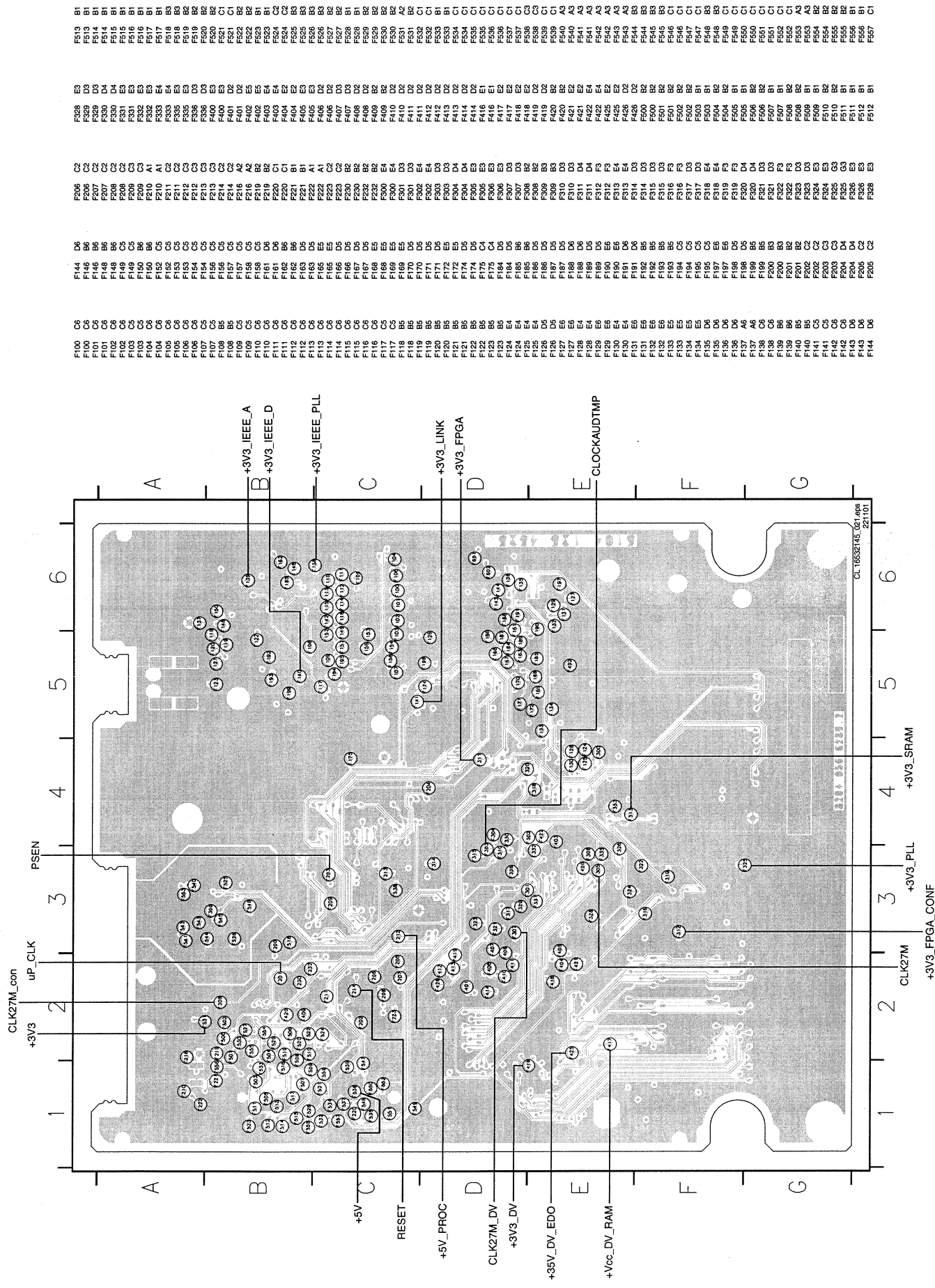


CL 1652145 19a.eps 211101

Layout DVIO Board (Part 2 Top View)

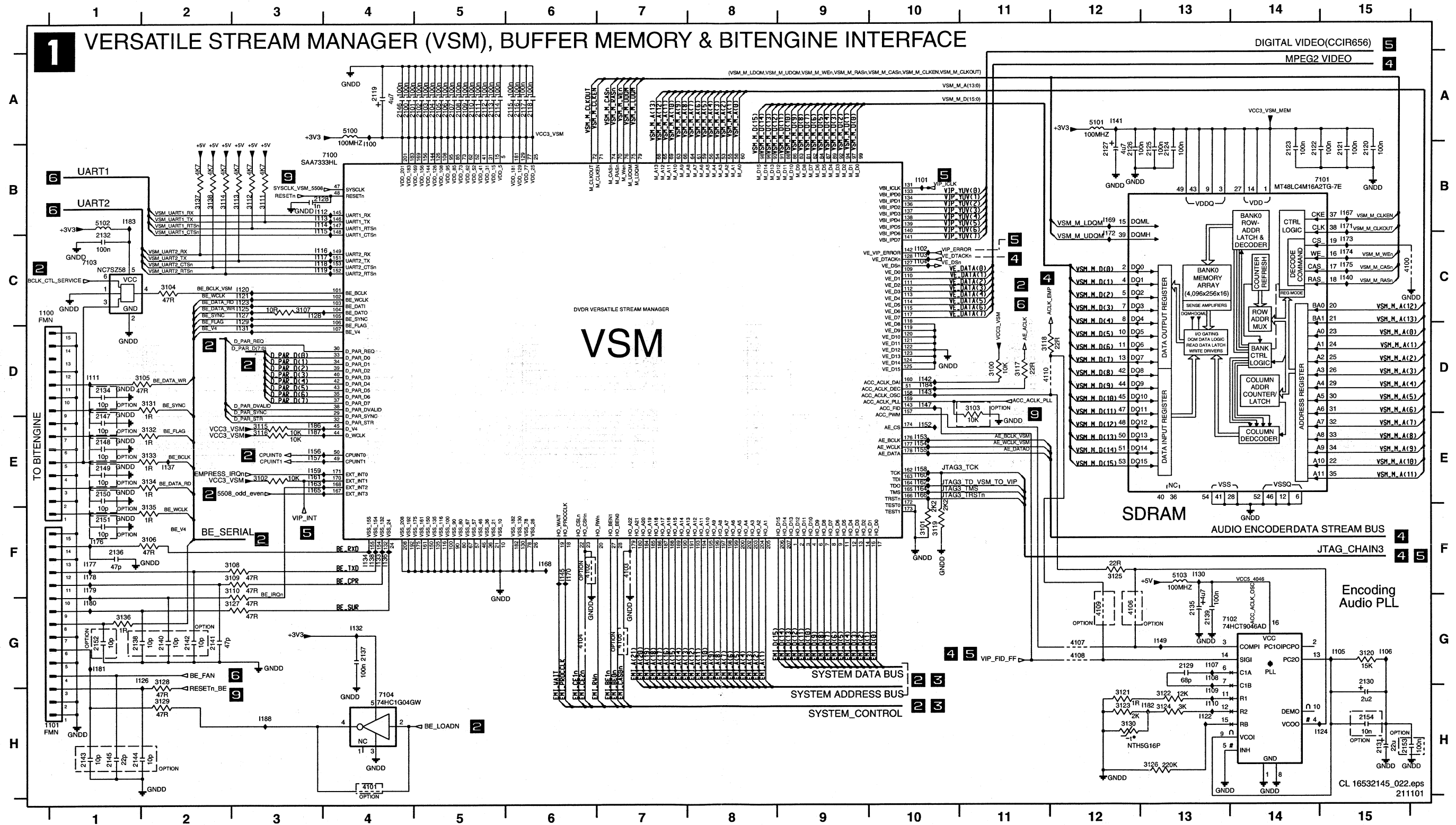


Layout DVIO Board (Testlands Bottom View)

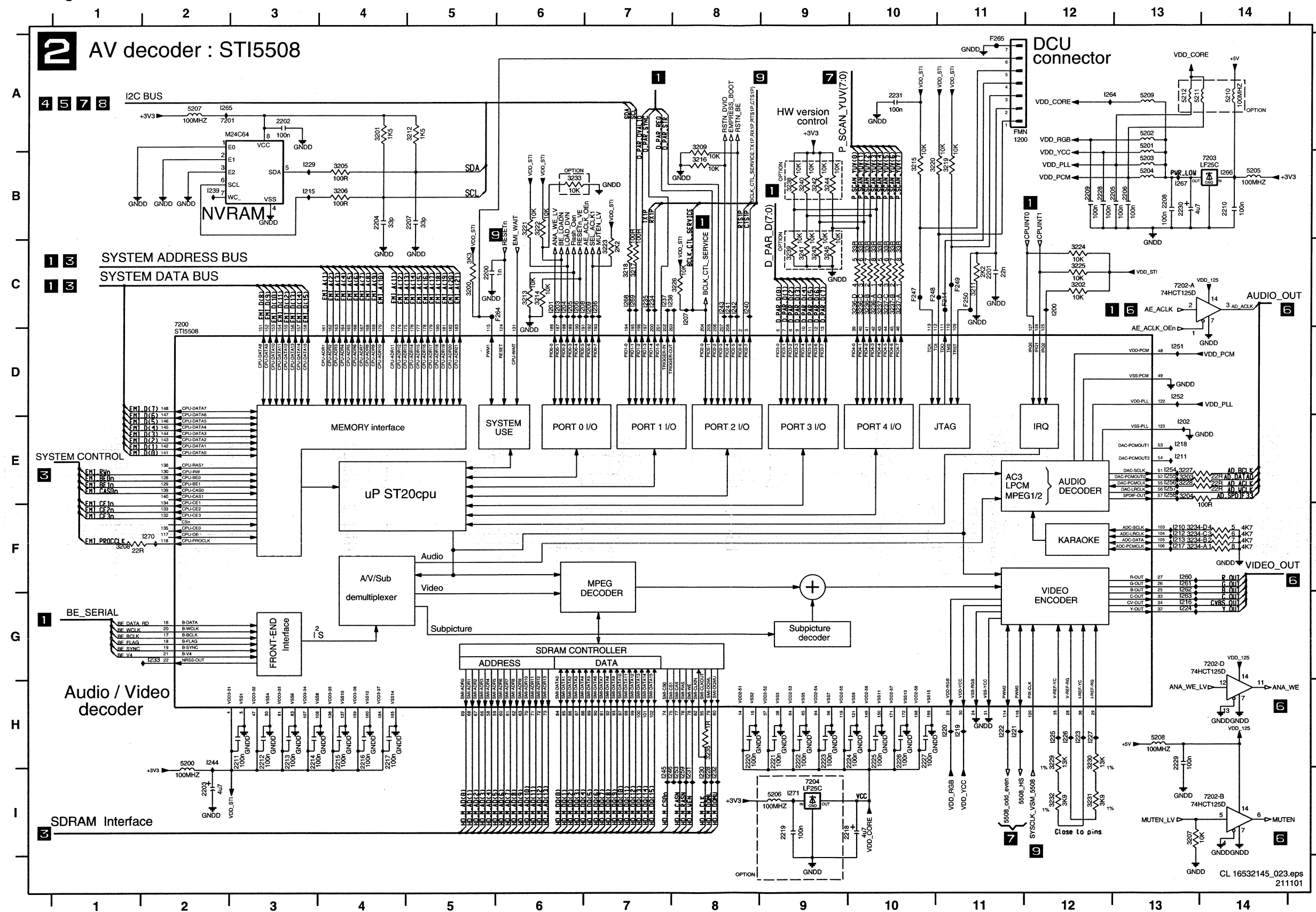


Digital Board: VSM, Buffer Memory and Bit Engine Interface

1100	C1	2106	A5	2114	A5	2122	B14	2130	G15	2139	G13	2147	D1	3102	E3	3110	F3	3118	D11	3126	H12	3134	E2	4103	F7	7101	B14
1101	H1	2107	A5	2115	A6	2123	B14	2131	H15	2140	G2	2148	E1	3111	B3	3119	F10	3127	G3	3135	E2	4104	G6	7102	G13		
2100	A4	2108	A5	2116	A6	2124	B13	2132	B1	2141	G2	2149	E1	3104	C2	3112	B3	3120	G15	3128	G2	3136	G1	4105	G7	7103	C1
2101	A5	2109	A5	2117	A6	2125	B13	2134	D1	2142	G2	2150	E1	3105	D2	3113	B3	3121	G12	3129	H2	3137	B2	5100	A4	7104	H4
2102	A5	2110	A5	2118	A6	2126	B12	2135	G13	2143	H1	2151	F1	3106	F2	3114	B2	3122	H12	3130	H12	3138	B2	5101	A12		
2103	A5	2111	A5	2119	A4	2127	B12	2136	F1	2144	H1	2152	G1	3107	C3	3115	E3	3123	H12	3131	D2	4100	C15	5102	B1		
2104	A5	2112	A5	2120	B15	2128	B3	2137	G4	2145	H1	3100	D11	3108	F3	3116	E3	3124	H12	3132	E2	4101	H4	5103	F13		
2105	A5	2113	A5	2121	B15	2129	G13	2138	G1	2146	A4	3101	F10	3109	F3	3117	D11	3125	G14	3133	E2	4102	F6	7100	B4		



Digital Board: AV Decoder STI5508



1200	A11	5207	A2
2200	C5	5208	H13
2201	C11	5209	A13
2202	A3	5210	A14
2203	I2	5211	A13
2204	B4	5212	A13
2205	B13	7200	C2
2206	B13	7201	A2
2207	B5	7202-A	C13
2208	B13	7202-B	I14
2209	B12	7202-D	G14
2210	B14	7203	B14
2211	H3	7204	I9
2212	H3	F214	C11
2213	H3	F247	C10
2214	H3	F248	C10
2215	H4	F249	C11
2216	H4	F250	C11
2217	H4	F264	C6
2218	I10	F265	A11
2219	I9		
2220	H8		
2221	H9		
2222	H9		
2223	H9		
2224	H10		
2225	H10		
2226	H10		
2227	H10		
2228	B12		
2229	H13		
2230	B13		
2231	A10		
3200	C5		
3201	A4		
3202	C12		
3203	E13		
3204	E13		
3205	B4		
3206	B4		
3207	I13		
3208	F1		
3209	A8		
3211	C11		
3212	A5		
3213	C6		
3214	C6		
3215	B10		
3216	B8		
3217	C7		
3218	C7		
3219	B11		
3220	B10		
3221	B6		
3222	B6		
3223	C7		
3224	C12		
3225	C12		
3226	C8		
3227	E13		
3228	E13		
3229	H12		
3230	H12		
3231	I12		
3232	I12		
3233	B6		
3234-A	F13		
3234-B	F13		
3234-C	F13		
3234-D	F13		
3235	H8		
3236-A	C10		
3236-B	C10		
3236-C	C10		
3236-D	C10		
3237-A	C10		
3237-B	C10		
3237-C	C10		
3237-D	C10		
3238	B9		
3239	C9		
3240	B9		
3241	C9		
3242	B9		
3243	C9		
3244	B9		
3245	C9		
5200	H2		
5201	A13		
5202	A13		
5203	B13		
5204	B13		
5205	B14		
5206	I9		

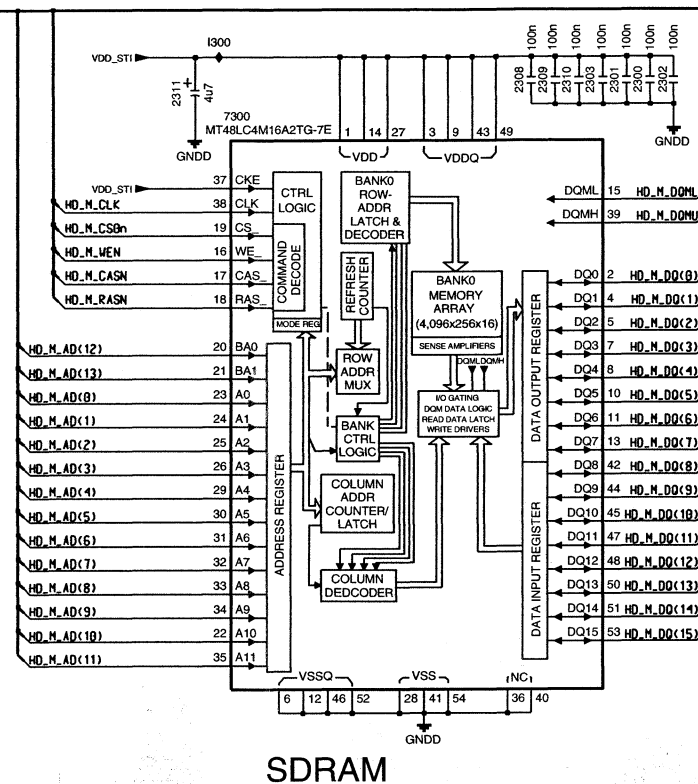
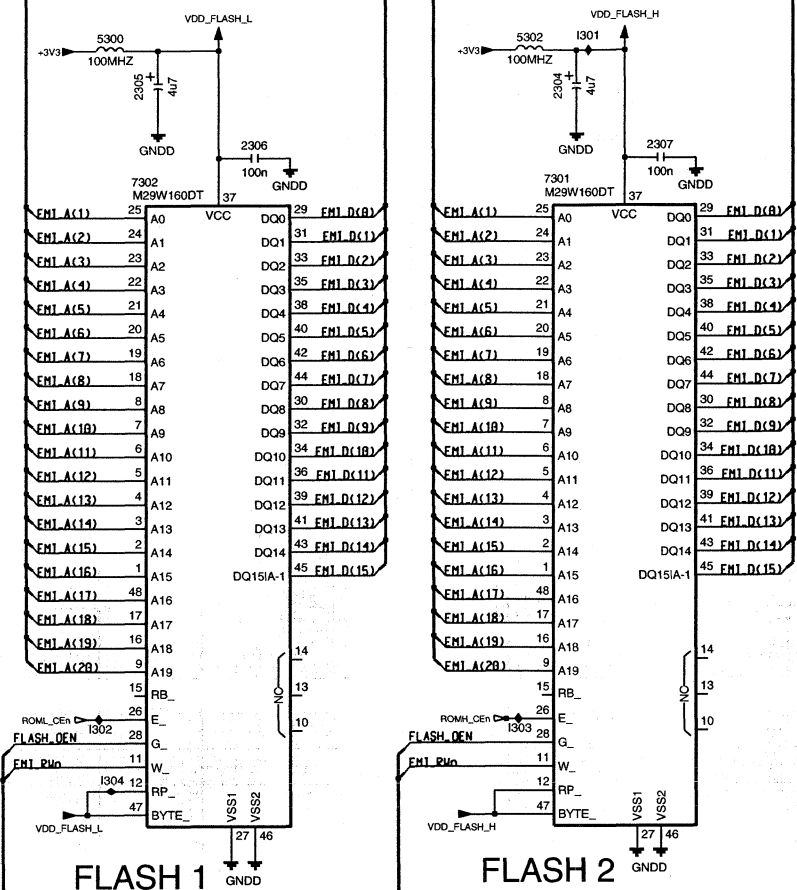
Digital Board: AV Decoder Memory

3 AV Decoder Memory

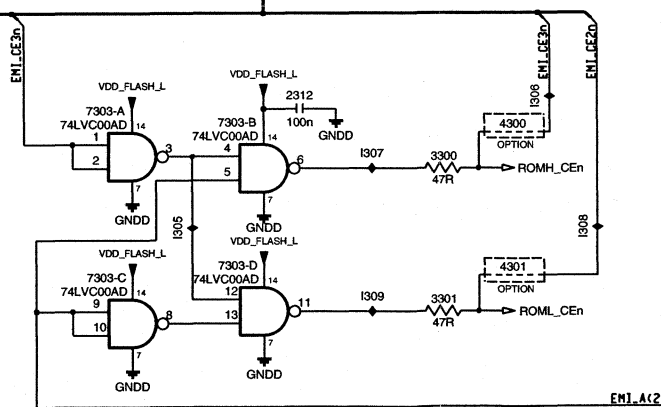
2 SDRAM Interface

1 2 SYSTEM DATA BUS

1 2 SYSTEM ADDRESS BUS



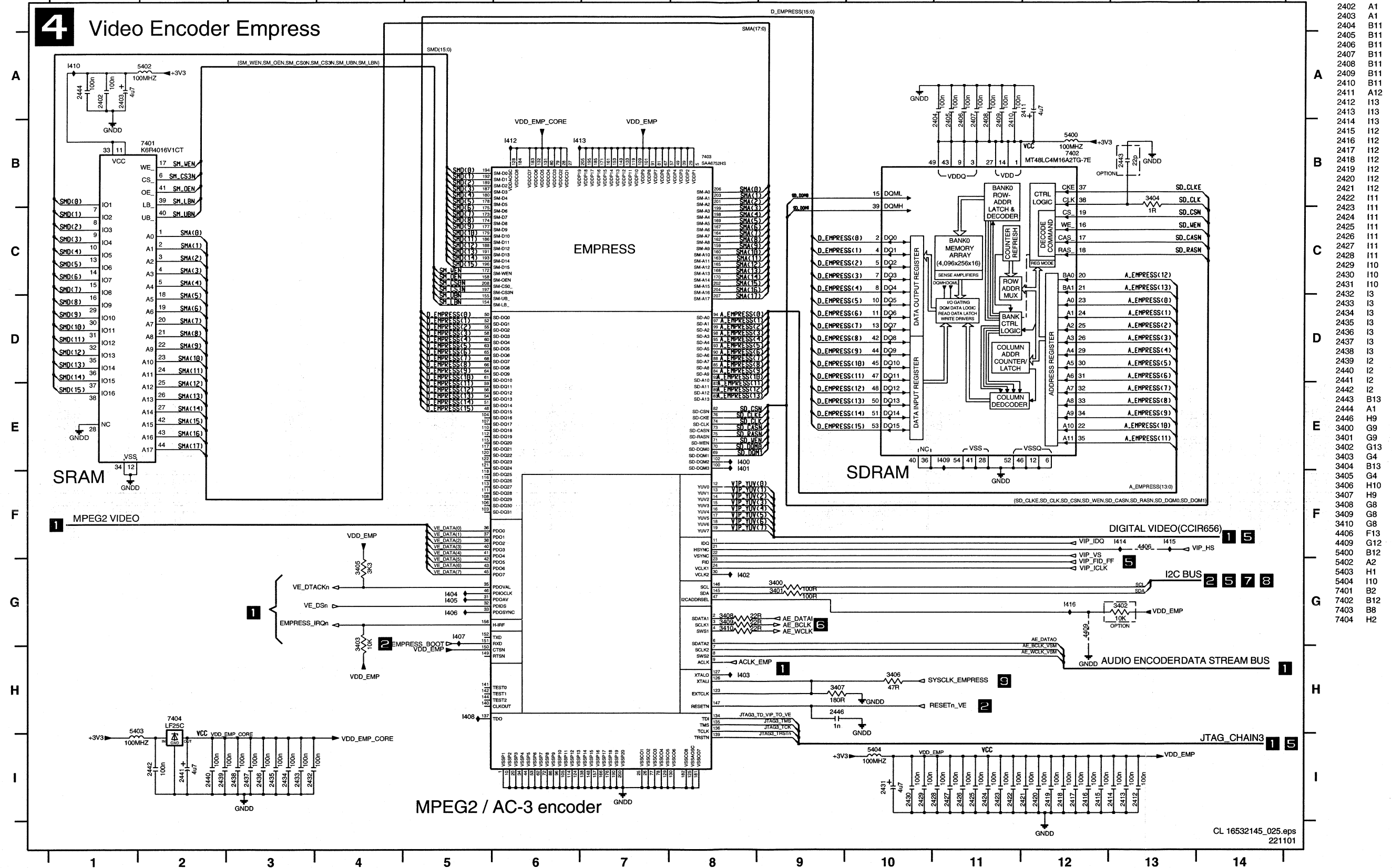
1 2 SYSTEM CONTROL
(EMI_RWn, FLASH_OEN, EMI_CE2n, EMI_CE3n)



2300 A14
2301 A14
2302 A14
2303 A13
2304 B8
2305 B6
2306 B6
2307 B9
2308 A13
2309 A13
2310 A13
2311 A11
2312 H7
3300 H8
3301 I8
4300 H9
4301 I9
5300 B5
5302 B8
7300 A11
7301 B8
7302 B6
7303-A H6
7303-B H7
7303-C I6
7303-D I7

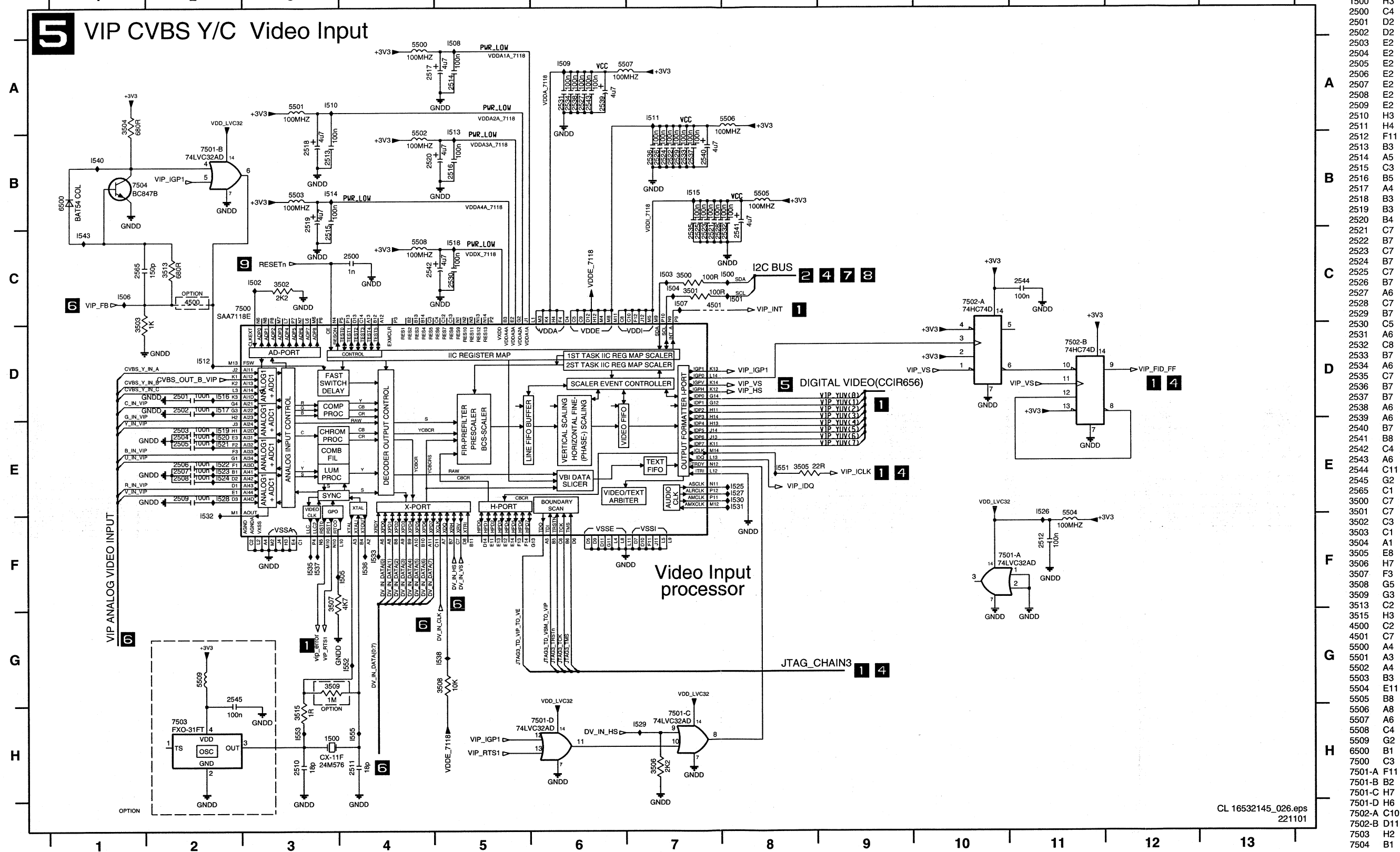
Digital Board: Video Encoder, Empress

4 Video Encoder Empress

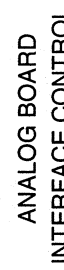


2402 A1
2403 A1
2404 B11
2405 B11
2406 B11
2407 B11
2408 B11
2409 B11
2410 B11
2411 A12
2412 I13
2413 I13
2414 I13
2415 I12
2416 I12
2417 I12
2418 I12
2419 I12
2420 I12
2421 I12
2422 I11
2423 I11
2424 I11
2425 I11
2426 I11
2427 I11
2428 I11
2429 I10
2430 I10
2431 I10
2432 I3
2433 I3
2434 I3
2435 I3
2436 I3
2437 I3
2438 I3
2439 I2
2440 I2
2441 I2
2442 I2
2443 B13
2444 A1
2446 H9
3400 G9
3401 G9
3402 G13
3403 G4
3404 B13
3405 G4
3406 H10
3407 H9
3408 G8
3409 G8
3410 G8
4406 F13
4409 G12
5400 B12
5402 A2
5403 H1
5404 I10
7401 B2
7402 B12
7403 B8
7404 H2

5 VIP CVBS Y/C Video Input

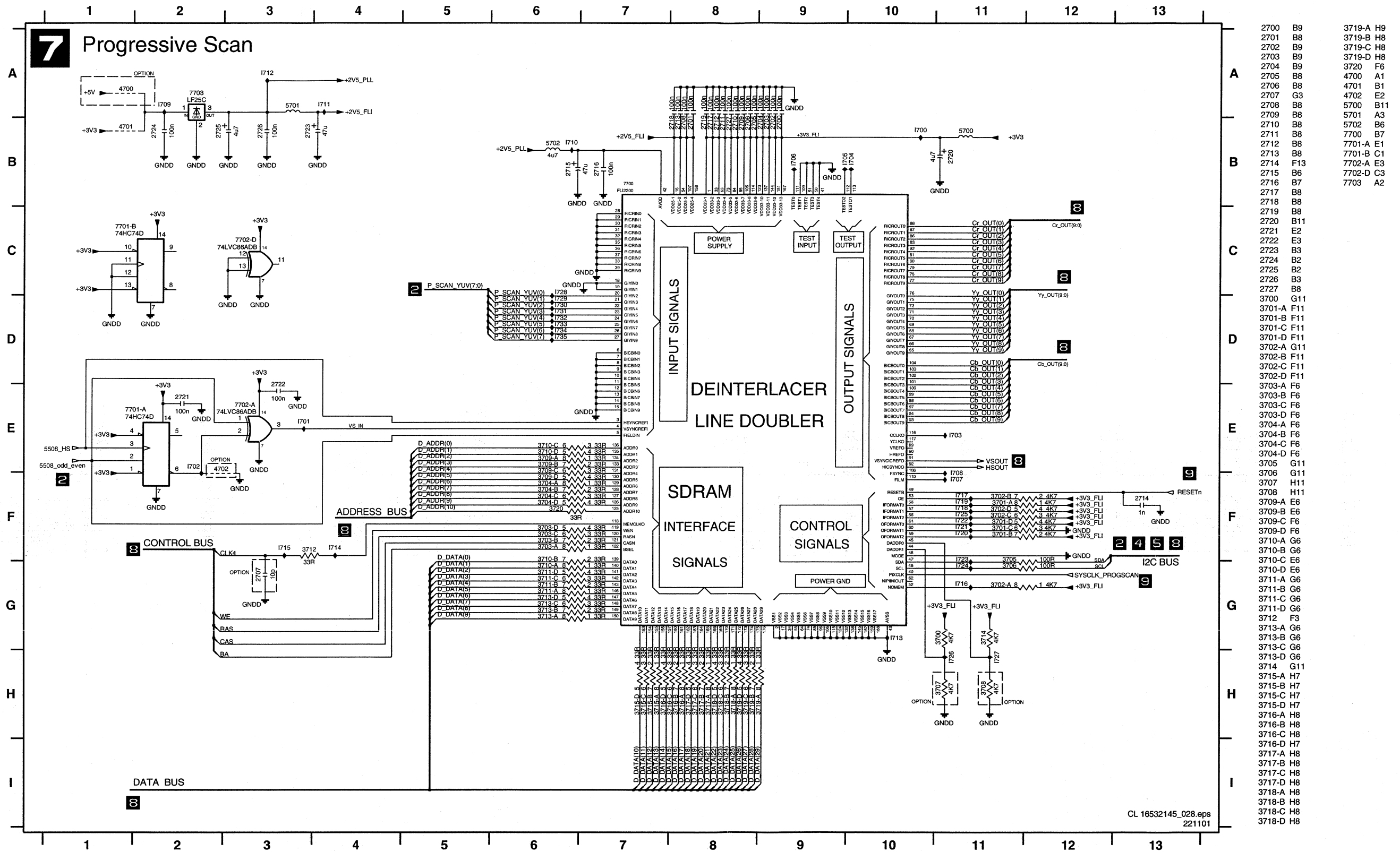


6 Analog Board Cons. Video In / Output



1600	H14	7202-C	D12
1601	D14	7600	E6
1602	C14	7601	G10
1603	E2	7602	B3
2600	E6	7603	G6
2601	E5	7604	I10
2602	E5	7605	I6
2603	C12	7606	E10
2604	C13		
2605	E10		
2606	E9		
2607	E9		
2608	A6		
2609	A6		
2610	G6		
2611	G5		
2612	G5		
2613	A9		
2614	B9		
2615	F10		
2616	G9		
2617	G9		
2618	A9		
2619	C9		
2620	H6		
2621	I5		
2622	I5		
2623	C12		
2624	C12		
2625	H10		
2626	I9		
2627	I9		
2628	C6		
2629	A6		
2630	A2		
2631	C12		
2632	A2		
2633	B9		
2634	B2		
2635	C9		
2636	H9		
3600	D13		
3601	E5		
3602	E6		
3603	F6		
3604	B12		
3605	A10		
3606	E8		
3607	E9		
3608	F10		
3609	A9		
3610	C10		
3611	G5		
3612	G6		
3613	H6		
3614	C9		
3615	B3		
3616	G8		
3617	G9		
3618	G10		
3619	B2		
3620	F1		
3621	I5		
3622	I6		
3623	A12		
3624	I6		
3625	A12		
3626	I8		
3627	I9		
3628	I10		
3629	A6		
3630	C6		
3631	B10		
3632	B6		
3633	C6		
3634	B9		
3635	B12		
3636	B2		
3637	B12		
3638	B3		
4600	G3		
4601	G1		
4602	G3		
5600	E5		
5601	G9		
5602	I5		
5603	G5		
5604	I9		
5605	E9		
5606	A2		
5607	H9		

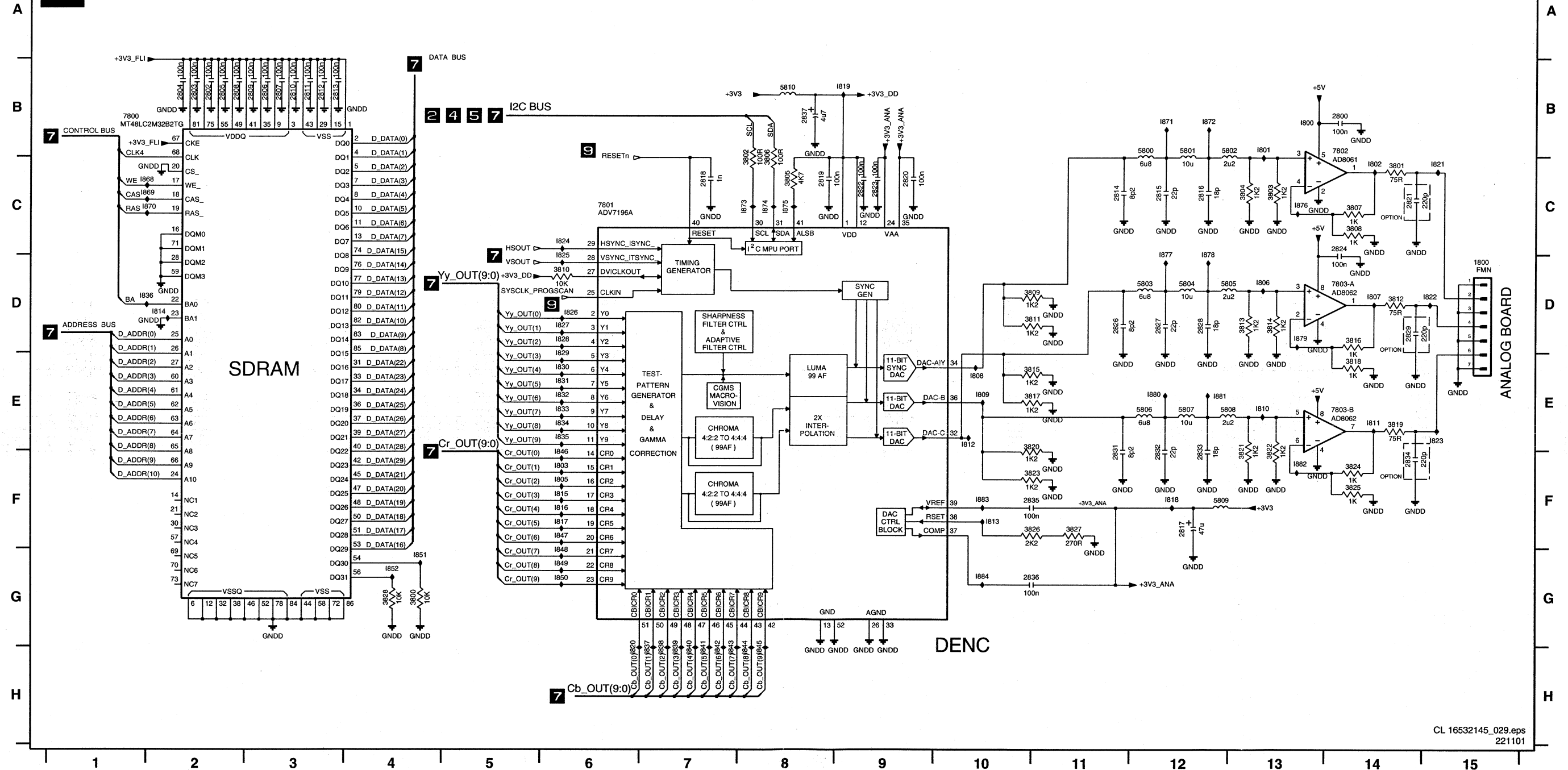
Digital Board: Progressive Scan



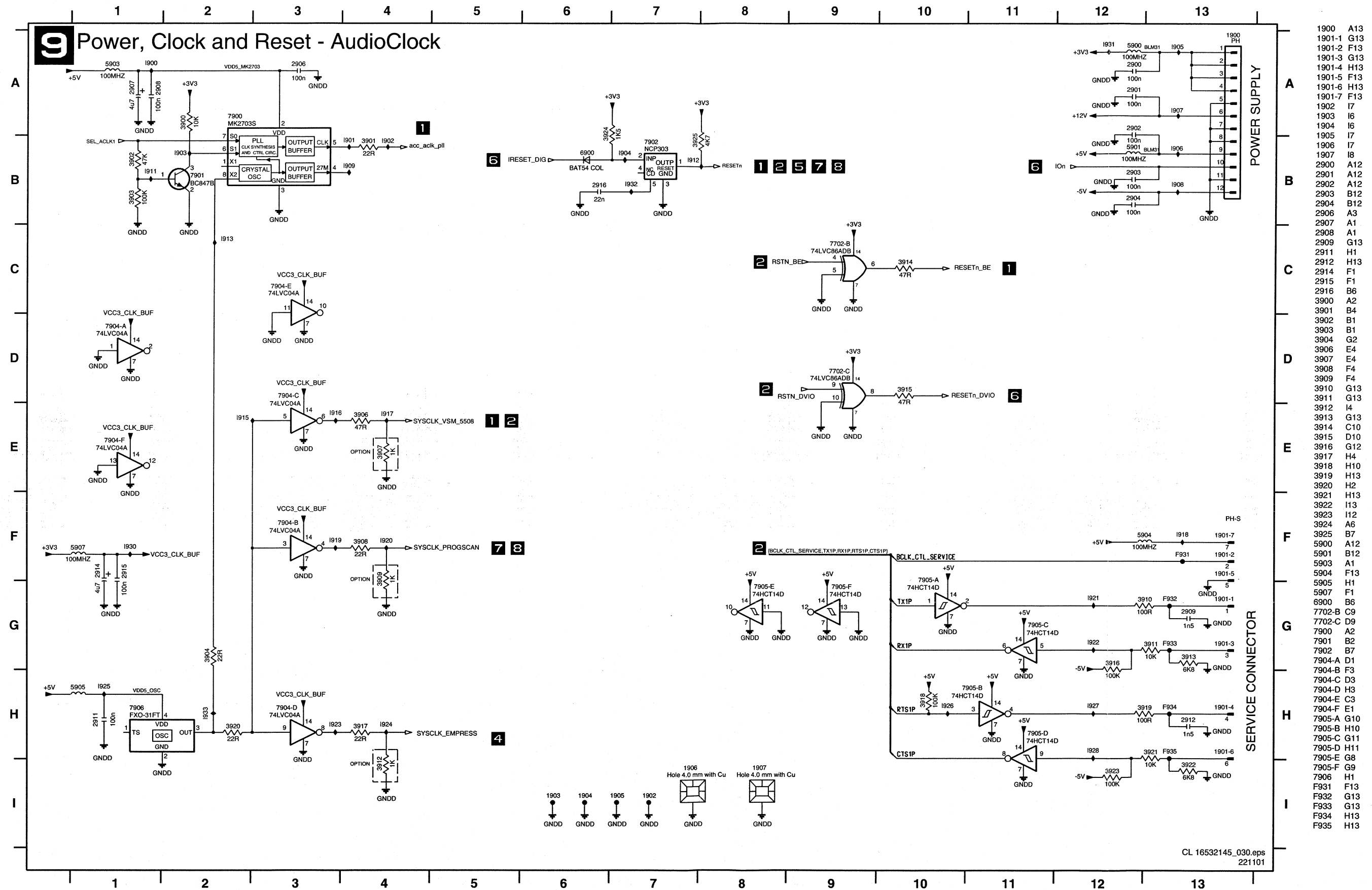
Digital Board: Progressive Scan

1800 D15	2806 B3	2812 B3	2818 C7	2824 C14	2832 E12	3800 G4	3806 B8	3812 D14	3818 E14	3824 F14	5801 B12	5807 E12	7802 B14
2800 B14	2807 B3	2813 B3	2819 C8	2826 D11	2833 E12	3801 C14	3807 C14	3813 D13	3819 E14	3825 F14	5802 B12	5808 E12	7803-A D14
2802 B2	2808 B2	2814 C11	2820 C9	2827 D12	2834 F14	3802 B8	3808 C14	3814 D13	3820 E10	3826 F11	5803 D12	5809 F12	7803-B E14
2803 B2	2809 B2	2815 C12	2821 C14	2828 D12	2835 F10	3803 C13	3809 D10	3815 E10	3821 E13	3827 F11	5804 D12	5810 B8	
2804 B2	2810 B3	2816 C12	2822 C9	2829 D14	2836 G10	3804 C13	3810 D6	3816 D14	3822 E13	3828 G4	5805 D12	7800 B1	
2805 B2	2811 B3	2817 F12	2823 C9	2831 E11	2837 B8	3805 C8	3811 D11	3817 E11	3823 F11	5800 B12	5806 E12	7801 C6	

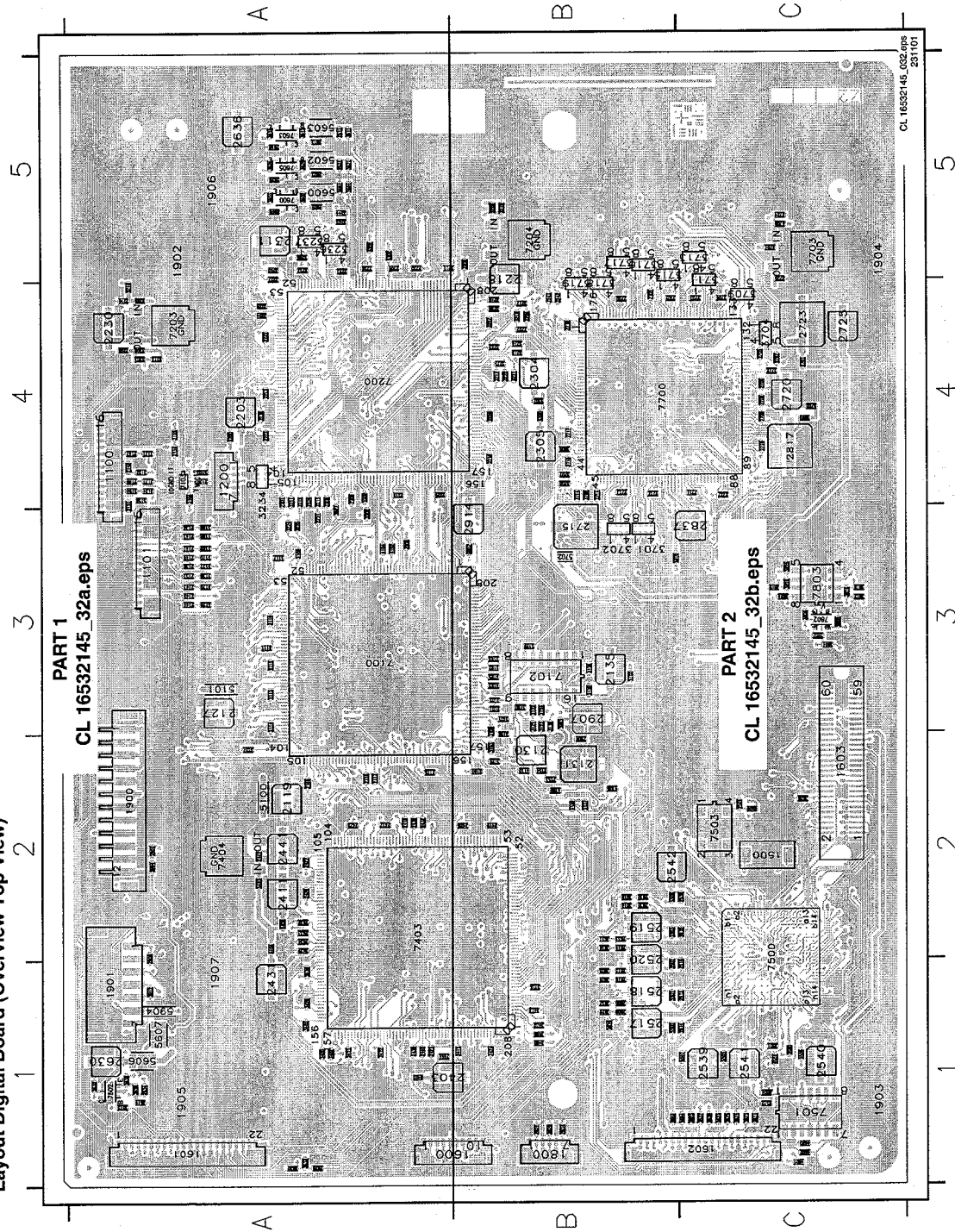
8 Progressive Scan



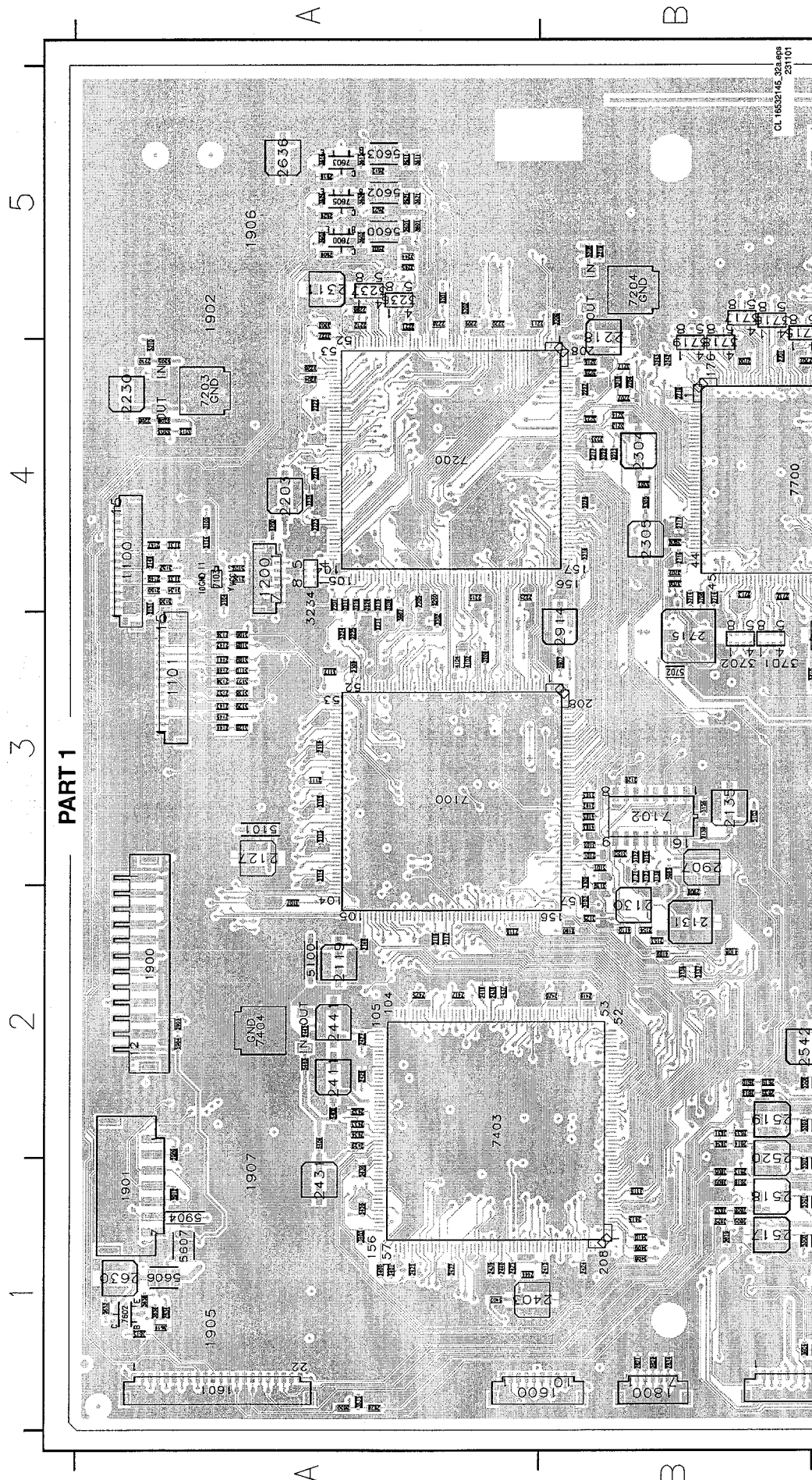
Digital Board: Power, Clock, and Reset Audio Clock



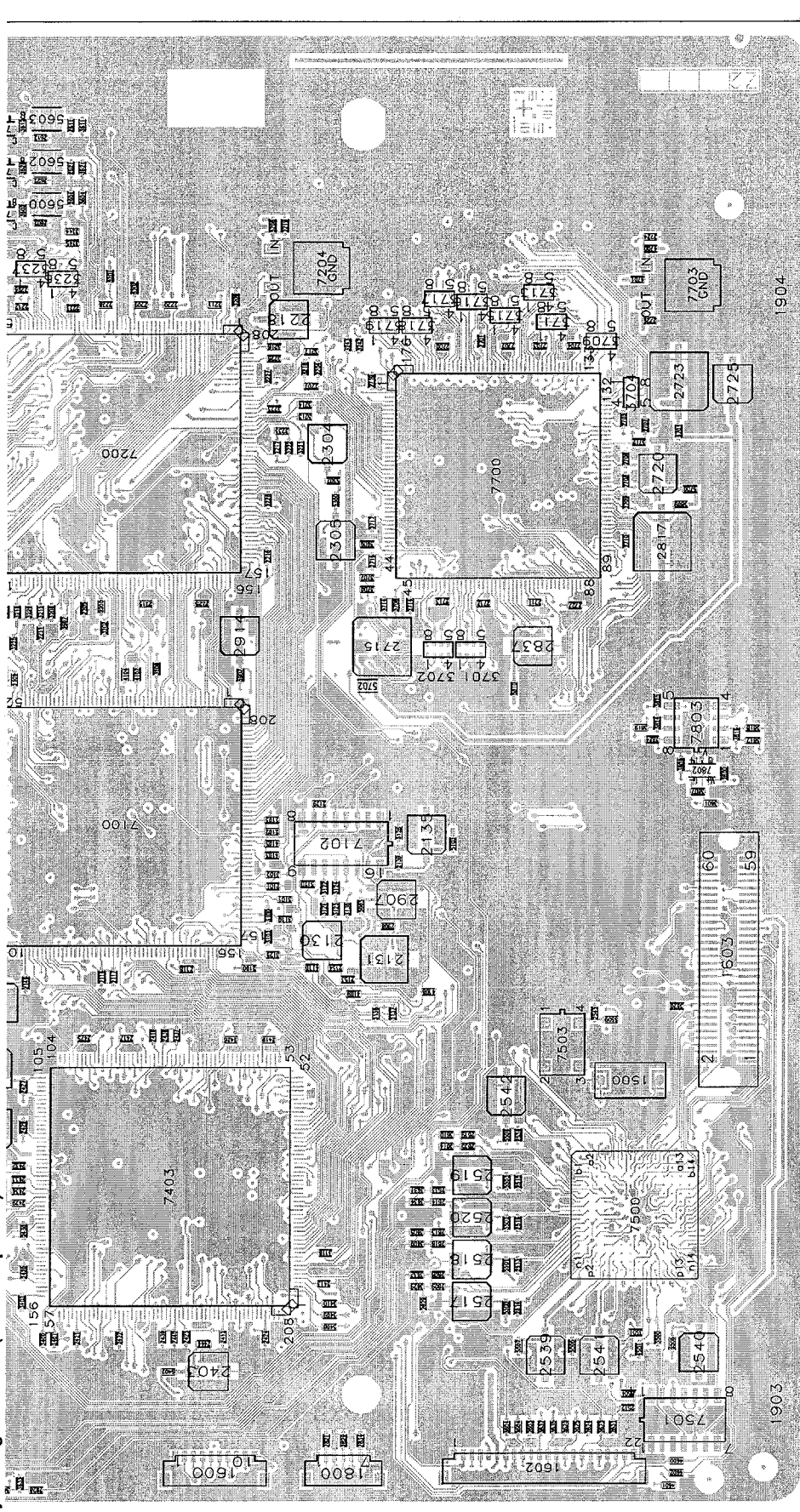
Layout Digital Board (Overview Top View)



Layout Digital Board (Part 1 Top View)



Layout Digital Board (Part 2 Top View)

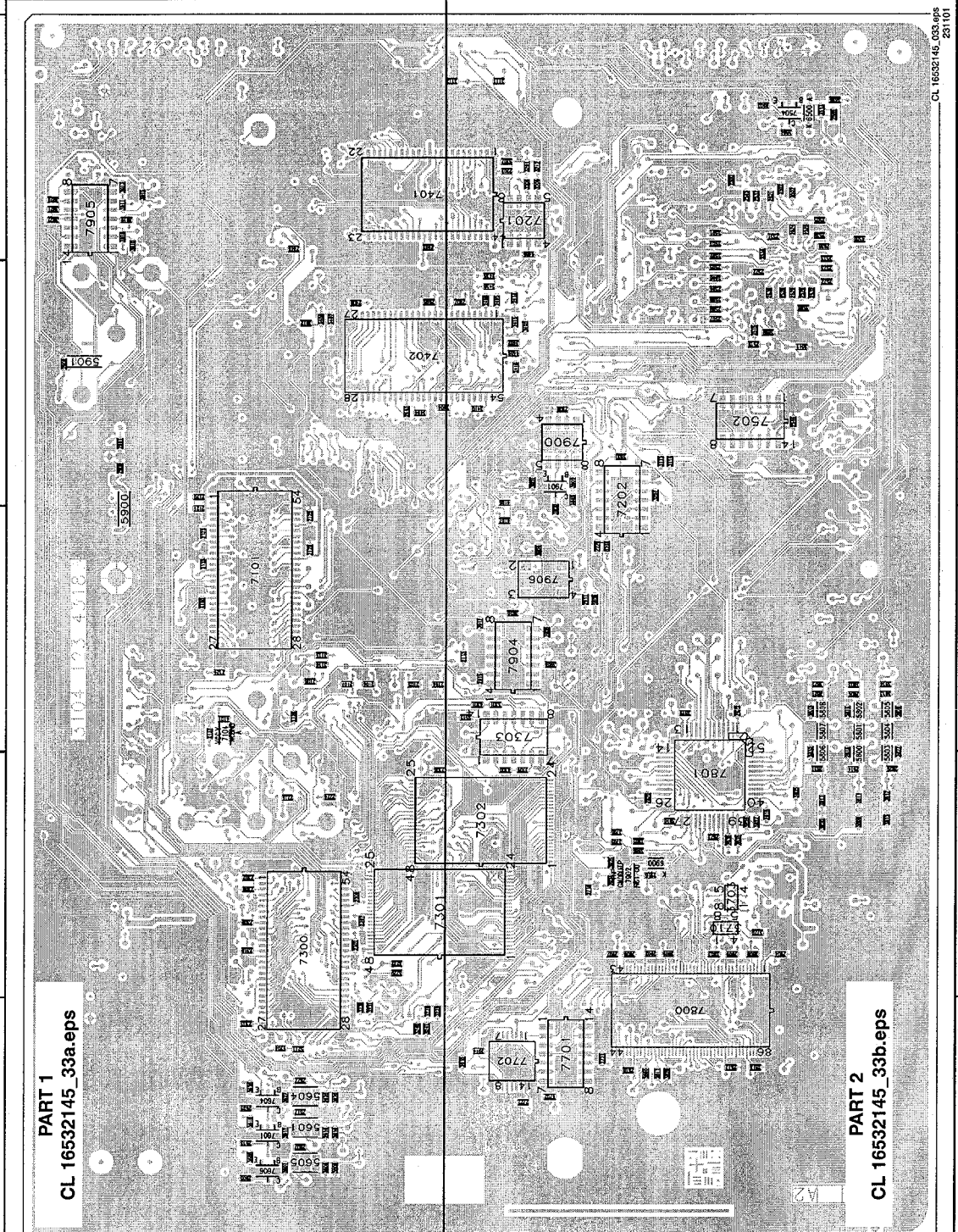


PART 2

CL 16532145_320.eps
231101

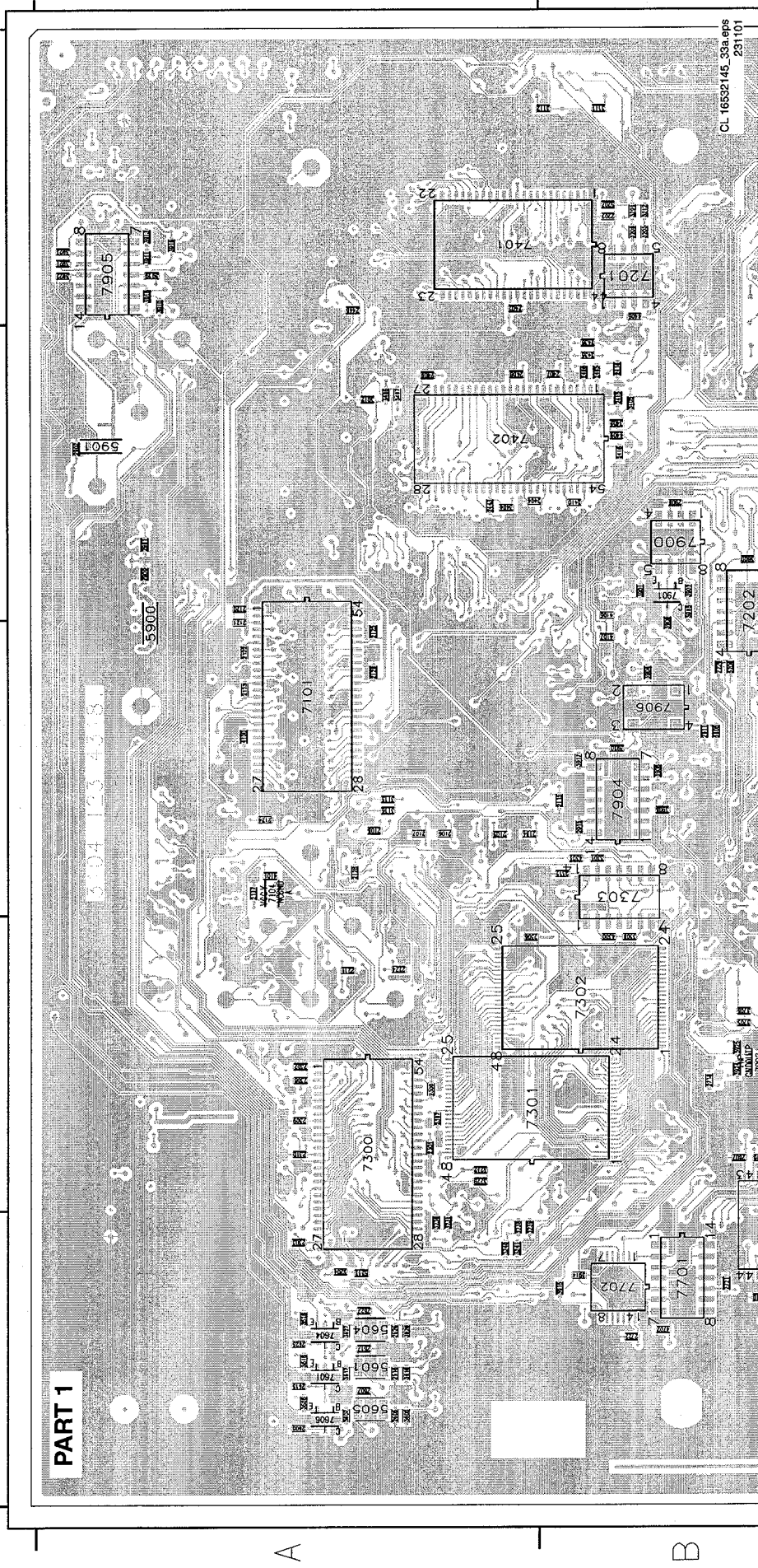
1 2 3 4 5

Layout Digital Board (Overview Bottom View)



Layout Digital Board (Part 1 Bottom View)

1 2 3 4 5

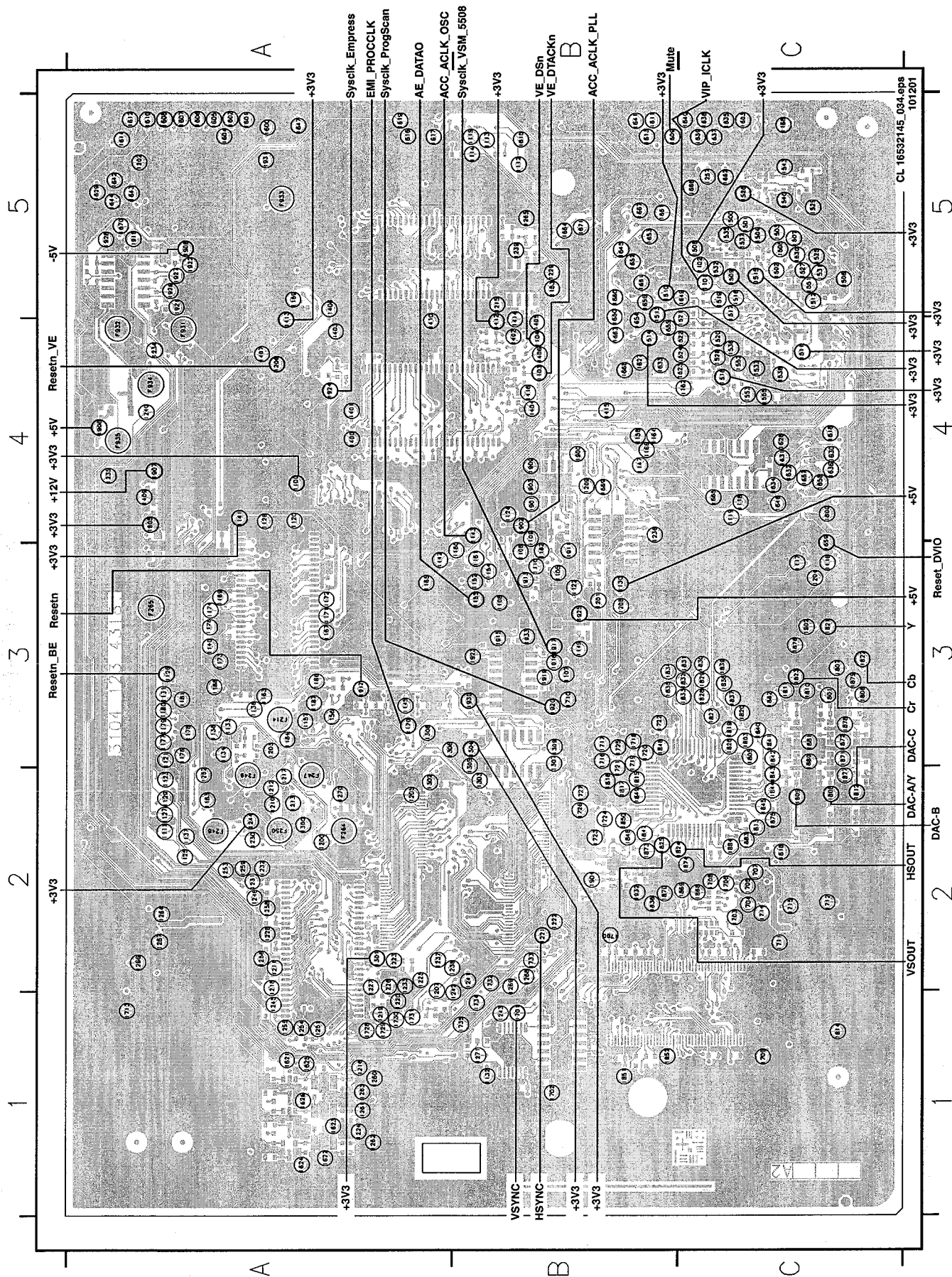


PART 2



A horizontal number line with tick marks labeled 1, 2, 3, 4, and 5.

Layout Digital Board (Testlands Bottom View)



CL 16532145-34m.eps
101201

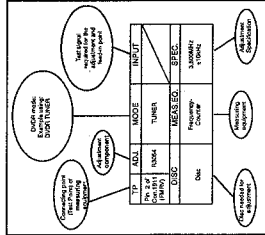
8. Alignments

8.1 Alignment Instructions Analogue Board

Test equipment:

1. Oscilloscope
2. HF - AGC adjustment (3726): Service leads after replacement of IC 7710:
Voltage range : 0.5 V/div
Frequency : 100 MHz
Probe : 10:1, 11
3. DVH (Digital voltmeter)
4. Frequency counter
5. Signal generator : 10 - 50 MHz
6. Test pattern generator

How to read the adjustment procedure:



Front End (FV)

Service leads after replacement of IC 7710, call L5710 and L5711:

1 AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit.
Symptom: If incorrectly set:
- picture is distorted
- picture is not in focus

PAL - AFC adjustment (L5711):

TP	ADJ.	MODE	INPUT
L5710 Pin 11 (F710)	L5711	TUNER	Signal generator at 100 MHz, Pin 11 (F710, F700)
DISC		MEAS EO	SPEC.
		DC Voltmeter	2.2V ±0.1V

Storage in NVRAM via command mode interface of DSPP:
The reference value is 256. The reference value is stored in the NVRAM.
The reference value is 256. The reference value is stored in the NVRAM.
Example: 255 - 256 - 257

8.2 Reprogramming Procedure of NVM on the Microprocessor Sub PCB

The NVM, item 7808, on the Microprocessor Sub board contains the following factory settings:

1. Clock correction factor
2. AFC reference value
3. Slash version

The settings 1, 2 and 3 are stored in the NVM during the production process.

The slash version is stored at the end of the production line of the set.

In case of failure, the NVM must be replaced by an empty one. In any case, the NVM must be replaced by an empty one.

Notes: In any case, the NVM must be replaced by an empty one. In any case, the NVM must be replaced by an empty one.

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8.2.3 Slash Version

The slash version is stored with command 715 followed by the slash version as parameter.

The slash version stored in DVD-R880 and DVD-R890 are the following:

- DVD-R880/00X: 63
- DVD-R880/02X: 63
- DVD-R880/04X: 61
- DVD-R880/06X: 61
- DVD-R880/08X: 61
- DVD-R880/10X: 62
- DVD-R880/12X: 62
- DVD-R880/14X: 61
- DVD-R880/16X: 61

Example:

DD-715 63

Reset of Slash Version

Set command 729 to reset the analogue board to the default value.

Procedure:

- Put the set in DSW command mode
- Execute command 729 with the following parameters:
- parameter 1: 0 (reset)
- Leave the DSW command mode and start up the set in application mode
- No background is visible on the TV screen. The analogue board is ready to accept the appropriate slash version

8.3 Rework Procedure IEEE Unique Number

8.3.1 Scope:

The procedure describes how to upgrade sets with a unique number after repair. This unique number is stored in the NVRAM (item 7201) of the digital board at the end of the production process.

- The digital board is only valid or necessary when:
- The digital board is replaced
- NVRAM is cleared
- The digital board is replaced
- The digital board is replaced

8.3.2 Handling:

State of original (defective) board:

1. The digital board starts up in Diagnostics Mode: follow procedure A to retrieve the valid unique number
2. The digital board does NOT start up in Diagnostics Mode: follow procedure B.

8.3.3 Procedure A

1. Connect defective digital board to PC via serial cable (3122 785 90017) terminal or any other serial terminal via the correct settings (DSW command mode interface)
2. read out existing unique number via nucleus 403
example:
DD-403 40300-DV Unique ID = 00D7A1FC9C
3. Test OK
4. note read out
5. program new digital board via nucleus 410
example: DD-410 00D7A1FC9C
6. Test OK

The set has now the original unique number

Figure 8-1

8.3.4 Procedure B

1. Note the serial number of the set.
example:
VN50136130156
 - VN = production centre (VN...Szekesfehervar).
 - 05 = coding to UAW-505 Y-22 and N-14
 - 1361 = the date (this is not used for this calculation)
 - 01 = YEAR
 - 39 = Production WEEK
 - 156 = the number out of 10 hexadecimal numbers.
2. Calculate the unique number: this number always exists out of 10 hexadecimal numbers.
3. First 5 numbers:
3828³ YEAR + 675³ WEEK + 28³ V + N + 8788
The figures are fixed, YEAR + WEEK + factory code (V + N) are variable
38282014279+28³2722+14+8788 = 69538 (decimal)
Then we translate the decimal number to a hexadecimal number.
example:
69538 (decimal) = 10FA2 (hex)
4. The last 5 numbers.
The last 5 numbers exist out of the Lot and SERIAL number.
We have to translate the decimal number to the next 5 hexadecimal numbers.
Example:
130156 (decimal) = 1FC6C (hex)
If the set has the 10 hexadecimal numbers we calculate next:
D05-4101007A1FC6C
example:
41000:
The ON. ®
5. The set has now its original unique number

9. Circuit-, IC Descriptions and List of Abbreviations

9.1 Display Board	9.1.7 REC-LED
9.1.1 Microcontroller	The REC-LED is a red LED, located on a small PCB together with the REC-Switch and controlled via pin 3 of the microcontroller. The POS [7180] is used as a diode for the led.
The core element of the Display Control unit is the microcontroller TMP97CH74AF [7110]. The TMP97CH74AF is an 8 bit microcontroller fitted with 32KB ROM and 1KB RAM. It requires 5V and 3V3 supply and has the following functions: <ul style="list-style-type: none">• Transfer of data from the keyboard to the microcontroller• Interface to Central Controller• Evaluation of the keyboard matrix<ul style="list-style-type: none">• Decoding the remote control commands from the infra-red receiver• Active and passive control of the local display• Addressing of the display segments• Heater voltage generationThe 8 MHz resonator (Pos. 1111) generates the system clock. The reset is generated by the CC-JP via -POR_LC-signal where the transistor [7106] is used as a level-shifter from 3V3 to 5V.	9.1.2 Microcontroller Sub Board (UPC12 SUB PCB) General This small PCB is directly soldered in on top of the Analogue Board. It is used with no diversity in all three different basic versions (Europe, NAFTA and APAC-Pal). Only the software being loaded into the external Flash-memory is not the same. Microcontroller The main part of the Sub-PCB is the central controller (CC) JP [7804] TMP91CW12AF, which is a 16-bit CPU with 16KB on-chip ROM and 16KB on-chip RAM. It is powered up by a 3V3 supply and a system clock of 24.576MHz [1801]. The 3V3-supply is made out of the "5V31BY" by the circuit around [7816]. The reset of the CC is generated by the CC-JP and generates a reset pulse. The signal (NPORT) is directly fed to the first priority interrupt input (pin 63) for power fail detection and also to the ResetInput of the CC (pin30) via [7803], which is necessary to load the code from the external Flash-ROM. In case of a power failure the CC can be kept in a sleep mode. The internal memory of the CC is too small for all necessary demands. Therefore an external Flash-ROM [7805] with 1MByte in size and a RAM [7803] with 128KByte are needed. Both are connected to the CC via a 16-bit data bus and an address-bus. The lower eight bus-line (A0 to A07) are multiplexed by [7801] and the "ALE"-signal of the CC. For updating of the software the external Flash-ROM can be reprogrammed by the JP. During this process [7807] is connected to the CC via a 16-bit data bus. When no matrix is connected, the CC is supplied via Gold-Cap [2816] during the power backup period. The diode [8802] prevents unwanted current consumption of other components. The microcontroller is clocked by the 8 MHz resonator and Real-Time-Clock. Only the microprocessor is supplied by the backup cell, not the external memories and the JP operates in a low frequency mode with the clock crystal [1805] only [32788 J42]. To adjust the clock the frequency can be maintained at pin 67 of the JP in a special test-mode. Control-Interfaces The CC is communicating with the digital board via a serial connection, which operates at a speed of 19.2 kbaud. The CC is connected to the TV set via a serial interface on [13869]. By generating a high level on pin 18 of the CC the digital PCB can be reset (inverter [7817] in between). Most of the other parts are controlled by the JP via I ² C-bus ("SDA" and "SCL"-signal). The FETs [7821] and [7822] are used for address driving. The TV set is connected to the CC via its supplies with 5V. The CC can also reset the display-board-JP by pulling pin 39 to high. The transistor [7819] acts as a level shifter for the "INT"-signal. The JP is connected to the TV set via a serial interface between the recording unit and the TV device at pin 14 of the Sert (P550-lineEasy Link). The processing is done via pin 14 (output) and pin 38 (input) of the CC and the circuit around [7813], [7814] and [7815].
9.1.2 Interface to the Central Control JP The communication to the main microcontroller (CC) on the JP-Sub-PCB is done via I ² C-interface, where the microcontroller is connected to the JP via pins 1 and 2. An additional wire ("NXT-line") is used to signal the Central controller that data are ready, e.g. when a key has been pressed. 9.1.3 Evaluation of the Keyboard Matrix There are 16 different keys on the display board. A resistor network is used to generate a specific direct voltage value, depending on the pressed key. Via the resistors 3168 and 3169 on the analog/digital (A/D) ports [7110 pin 37 and 38] the evaluation is done. 9.1.4 IR Receiver and Signal Evaluation The IR receiver [7150] contains a selectively controlled amplifier as well as a photo-diode. The photo-diode changes the received infrared signal into an electrical signal. On the output of the IR receiver [7150], a pulse sequence with TTL-level, which corresponds to the envelope curve of the received infrared signal, is generated. This signal is fed into the JP via pin 31. The sequence is fed into the controller for further processing via port TC [7110, pin20]. 9.1.5 Vacuum Fluorescence Display The VFD 110-05F240SNK [7030] is fully controlled by the microcontroller. The IC also includes the driving stages. Only two additional drivers [7031 and 7103] are necessary for the grids 8 and 10 because of their large size. 9.1.6 VFD Heater Voltage Generator The circuit around POS [7103, 7104 and 7105] is used to generate a proper AC-voltage for the filament of the VFD. For this the microcontroller generates an appropriate rectangular signal with 50% duty-cycle and a frequency of 30 kHz at pin 19. The signal is amplified by the transistor [7106] and fed into the Zener-Circuit [7038] and [7107]. The Zener-Circuit [7038] and [7107] is connected to the VFD via 3104 the two heater-pins of the VFD ("FL1" and "FL2") are clamped so that the grids and segments can be fully switched off.	9.2.3 Control-Interfaces The CC is communicating with the digital board via a serial connection, which operates at a speed of 19.2 kbaud. The CC is connected to the TV set via a serial interface on [13869]. By generating a high level on pin 18 of the CC the digital PCB can be reset (inverter [7817] in between). Most of the other parts are controlled by the JP via I ² C-bus ("SDA" and "SCL"-signal). The FETs [7821] and [7822] are used for address driving. The TV set is connected to the CC via its supplies with 5V. The CC can also reset the display-board-JP by pulling pin 39 to high. The transistor [7819] acts as a level shifter for the "INT"-signal. The JP is connected to the TV set via a serial interface between the recording unit and the TV device at pin 14 of the Sert (P550-lineEasy Link). The processing is done via pin 14 (output) and pin 38 (input) of the CC and the circuit around [7813], [7814] and [7815].

9.2.4 EEPROM

The EEPROM M24C16 [7808] is an electrical erasable and programmable, non-volatile memory. The EEPROM stores data specific to the device, such as the AFC-reference value of the Europa IF-part, the clock-correction-factor, etc. It is accessed by the μP via the I^2C -bus.

9.2.5.5 Sync Separator

To detect whether a video signal is available or not a separate IC [7825] is used to extract the sync information out of the video signal that is also routed to the digital board for recording.

While on the input a low-pass-filter ([2823] and [3669]) limits the bandwidth an additional 'filter' (circuit around [7818]) on the output avoids distortions. Afterwards the sync-signal is routed to pin11 of the CC.

9.2.6 Fan Control

To avoid unwanted temperatures inside the car, especially the engine compartment, the temperature of the air that has to pass over the GPU of the driver is very important. A fan is mounted on top of the engine engine. The speed control is based on the ambient temperature. A NTC resistor [3172] positioned on the display board generates a temperature voltage. An operational amplifier (9200-8) measures this voltage, which is then fed to the engine "FUEL" pin. Below 28°C the engine will start. The engine "FUEL" pin goes up to approximately 10V when the ambient temperature goes up to approximately 95°C. The second part of the Op-Amp (9200-4) prevents damage of any temperature-sensitive part in case the NTC or the engine are in between is damaged. It acts as a comparator and pulls the "FUEL" pin signal to 10V. As the fan has to be stopped in the case of a high temperature, a speed control is implemented. The speed of the fan is controlled by a speed control circuit (9200-3) and a 555 timer (9200-1). The 555 timer is configured as a square wave generator. The double-duty mode [9303] is used for both Op-Amp-circuits.

9.2.7 Power Supply

The 5SW and 8SW supply are switched off in case of standby from the P via the ISTBY-line. This is possible for power-save. The ISTBY-line must be low in case of STBY. There is also a power fail* circuit on the PS-schematic which is necessary to mute AUDIO when IFAIL is low.

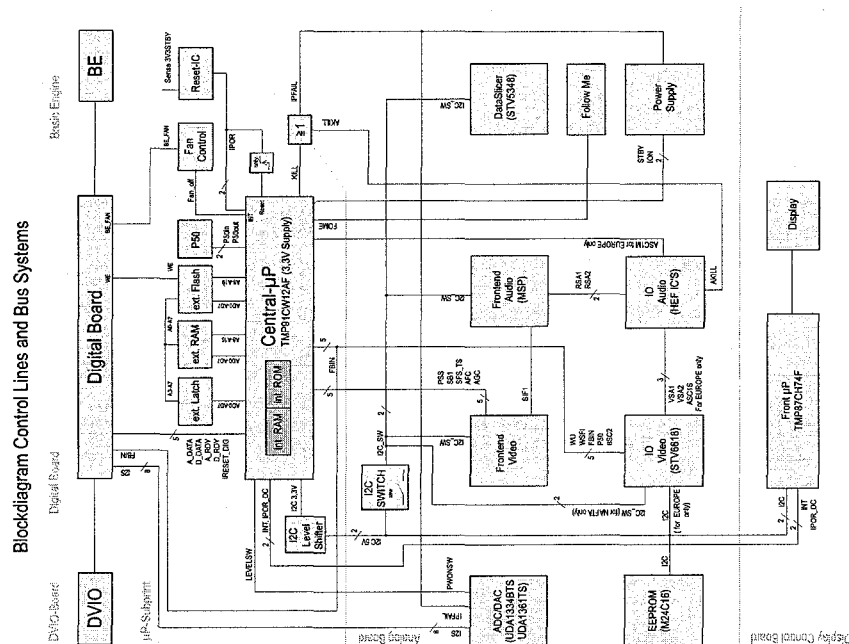
9.3 Analog Board Europe

9.3.1 General

This PCB consists out of the following parts:

- Power-Supply Unit
- Frontend (Audio & Video)
- Input/Output-switching
- Audio ADC- & DAC-processing
- VPS/PDC- and Text-Data slicer
- Analog Follow-Me Circuit

All functional groups are either controlled via I^2C -bus or via separate signal lines by the Central-Controller on the μP -Sub-board. This sub board is directly soldered in onto the analog PCB. During Stand-By mode of the set, several parts are not maintained (tuner, MSP, ...). The microprocessor is running and maintains the clock of the set.



The power supply works in the way of a flyback converter. The main supply part (1931 to 2026), which is a flyback transformer, is used and buffered in the capacitor (2026). From this direct voltage [5300, pins 1-5] during the conductive phase of the switching transistor (7307) and is stored there as magnetic energy. This energy is passed to the secondary output of the power supply in the blocking phase of the switching transistor (7307). With the switching-on time of the switching transistor (7307), the energy transferred in every cycle is regulated in such a way that the output voltages remain constant regardless of changes in the load or mains voltage. The power transistor is driven by the integrated circuit [7313].

Mains Input part:

The mains input part extends from the mains socket [1931] to the capacitor [2309]. The diodes [5001, 5302, 6005 and 6306] rectify the AC supply voltage, which is then buffered by the capacitor [2309]. The common mode coil [5302] and capacitor [2302] work as a filter to block interference arising in the power supply from the mains. Components [1302], [3306] protect the power supply against short-term over-voltages in the mains, e.g. caused by indirect lightning.

Start-up with Mains-on:

After connecting the power cord to the mains, the capacitor [3235] is loaded via a current source between pin 8 and pin 1 in the IC 7313. Once the voltage on [3235] and therefore the supply voltage V_{cc} of the IC 7313 has reached approx. 11V, the IC starts up and provides pulses at its output pin 5. These pulses are used to drive the gate of the power transistor [7307]. The frequency of these pulses is depending on load and mains voltage. The current consumption of the IC is approx. 5 mA at V_{cc} in normal mode.

V_{c} exceeds approx

loop), the output of the IC [7313, pin 5] is blocked and a new start-up cycle begins. (See also "Overload, Power Limitation, Burst Mode" section)

Normal operations

With increasing load on one or more of the power supply outputs, the switch-on time for the power transistor [3307] increases, and thus also the peak value of the delta-shaped current through this power transistor. The equivalent voltage of this current profile is passed (from resistors [3321] and [3352]) via (3365) to pin 5 of the IC 751313. If the voltage on pin 2 reaches approx. 0.4 V in one switching cycle, the conductive phase of the switching transistor is ended immediately. The check is done in each individual switching cycle. This process ensures that no more than approx. 50W can be taken out from the mains (= power limitation).

ages and the supp

be reduced following further loading. If V_{be} is less than approx 9V at any point during this process, the output of the IC [7313] pin 6] is blocked. All output voltages and V_{be} decrease and a new start-up cycle begins. If the overload status or short-circuit remains, the power limitation will be activated immediately and the voltages will again decrease, followed by another start-up cycle (**Burst Mode**). The amount of power taken up from the mains in **Burst Mode** is low.

Overload, power limitation, burst mode

With the power supply in normal mode, the periodic sequences in the circuit are divided primarily into the conducting and blocking phases of the switching transistor [7307]. During the **conductive phase** of the switching transistor [7307], current flows from the rectified mains voltage at capacitor [2309] through the primary coil of the transformer [5300, phases 7-5], the transistor [7307] and resistors [3321, 3321] to ground.

tion, an additional circuit for suppressing the audio carrier of the adjacent channel is used. This circuitry is adjusted by coil [5710] for maximum suppression at 40.4MHz.

IF demodulator

The signal from the tuner and F-selection circuit is processed by the demodulator IC TDA 9818/9817 (7710). The signal "PES" to switch between demodulation of positive or negative frequency is generated by the demodulator IC TDA 9818/9817 (7710). The signal "FSEL" is generated for demodulation in the sound processor 7600. This audio-F carrier is selected in the audio SAW filter 1702. This filter is switched for SECAM. If it is not conducting, the switch [7714] is closed and the signal "SRT" is not changing. For all other standards the signal "SRT" is always low. The output of the SAW filter of this SAW filter is firstly processed through the TDA 9818. Audio carriers are converted from the tuner IF level to the audio IF position and further processed in the audio demodulator 7600. The AFC coil [5711] on the TDA 9818/9817 is adjusted so that when a frequency of 38.90 MHz is applied to the input of the SAW filter, the output on pin 17 of TDA 9818 is 2.5V. This setting of the resonant frequency for SECAM in the TDA 9818 is achieved by connecting pin 7 of the IC via a resistor (37k) to ground. The tuner IC TDA 9818/9817 is also set using the potentiometer [3724] so that, with a sufficiently large antenna input impedance, the voltage at the input of the tuner [1703] pin 11 is about 0.9 V. The value of the

cameo out of the video cassette recorder (VCR) at approximately 15 dB [7106]. The signal was amplified by a gain of 10 and then sent to the A/D converter as shown in Figure 8. The digital AGC voltage at pin 4 is used to determine the level of the incoming signal. The signal is then amplified again after a buffer (7117) with the signal "AGC" and an analog input port of the Co-IP. The ramp (1704) reduces the sound carrier remainder in the video for EBU standards. The ramp (1708) works in the same way for the PAL standard only. For all other standards the switch (7113) is closed via T[706] and "SFS," line send "high" to bypass this ramp. In these cases the selectivity of the SAW filter (1701) is sufficient. The output (5131) for non-EBU standards realizes a frequency response correction. This correction is not defined for SECAM and therefore short-circuited by T[767] (signal SFS) is "high". The output (5132) is filtered by the low-pass filter (1709) and then passes through the buffer and limiting stage for PAL peaks (7111). The PAL-PAL difference function of TDA 8684 (7112) is not necessary and therefore decoupled by the resistor R[339].

Audio demodulator

The sound demodulation is done by the MSP3415 [7600], which is also fully controlled via PC-bus by the CC-uP (determination of bandwidth, amplitude, standard, ...). The audio signals are available at pin 30 and pin 31 of [7600] and fed as 'AFER-' & 'AFEL'-line to the audio-I/O for further processing.

This unit is designed to support two basic versions, which are distinguished by a different assembly variant only (one for multistandard and the second for Pat-I only) and comprises the following parts:

- Tuner UV1316K [1705]
- IF amplifier & video demodulator IC TDA 9818/9817 [7710]
- Sound processor MSP3415G [7600]

Tuner and IF selection

The Tuner [1705] converts the RF-signal coming from the antenna input to an IF-signal. The tuner is fully controlled via I²C-bus of the CC-uP [1705] is also equipped with a "passive loop-through" between antenna-in and -out to save power in stand-by of the set, when the complete part is not supplied. The IF frequency of the video carrier is 38.9 MHz for all systems except SECAM L' (34.0 MHz).

9.3.3.3 Frontend

This unit is designed to support two basic versions, which are distinguished by a different assembly variant only (one for multistandard and the second for Pat-I only) and comprises the following parts:

- Tuner UV1316K [1705]
- IF amplifier & video demodulator IC TDA 9818/9817 [7710]
- Sound processor MSP3415G [7600]

Tuner and IF selection

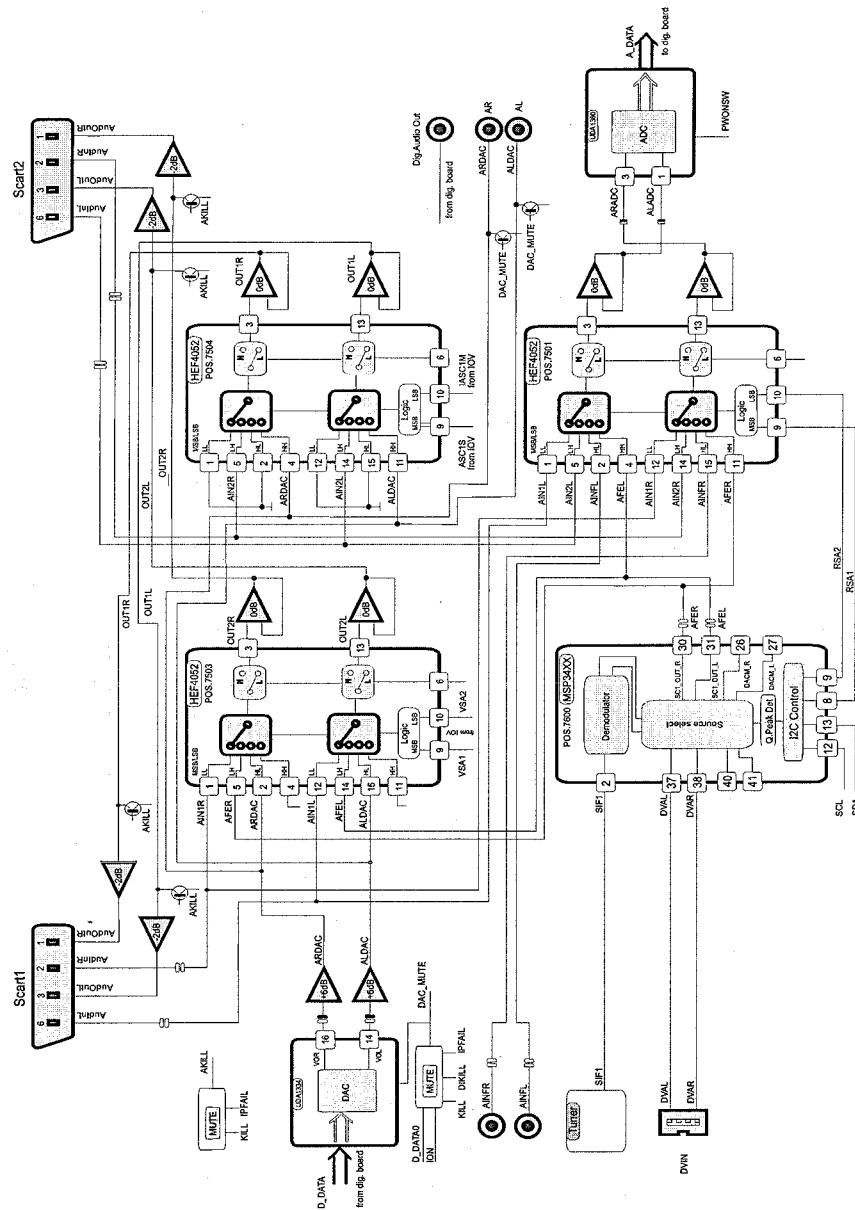
The Tuner [1705] converts the RF-signal coming from the antenna input to an IF-signal. The tuner is fully controlled via I²C-bus of the CC-uP [1705] is also equipped with a "passive loop-through" between antenna-in and -out to save power in stand-by of the set, when the complete part is not supplied. The IF frequency of the video carrier is 38.9 MHz for all systems except SECAM L' (34.0 MHz).

Overload, power limitation, burst mode

With the power supply in normal mode, the periodic sequences in the circuit are divided primarily into the conducting and blocking phases of the switching transistor [7307]. During the **conductive phase** of the switching transistor [7307], current flows from the rectified mains voltage at capacitor [2309] through the primary coil of the transformer [5300, phases 7-5], the transistor [7307] and resistors [3321, 3321] to ground.

9.3.4 Audio routing

Audio IO Europa Overview



11.03.2002 Vers. 05

Video 10 Europe Overview



The complete Video-I/O-switching is basically realized by the matrix switch STV6618 [7408], which is controlled via PC-BUS by the CC. All video outputs occurring pin 21 (YCVBS-REC) have a 6 dB-amplification and a 75 Ohms driver-stage inside. This CC includes also several digital outputs, which are used for switching purposes on the analog board. The record selector switches the signal selects between the CVBS from front and rear camera into the CVBS from the CVBS control (CVF), the input from scan 1 ("YCVBSIN1") or the signal from scan 2 ("YCVBSIN2"). Afterwards the signal passes another switch or CVBS control (CVBS) and is selected between the front or the preswitched ones are done. The output signals of [7411] are led as "YCVBS*", and "A_C"-line to the digital board for further processing.

To reduce the number of external presets there exists only one preset for CVBS- and Y/C-front. The set automatically detects between the two inputs depending on the presence of a video signal (sync separator-circuit on MP-sub-board) where Y/C has higher priority.

The HVB-inputs and the Fast-Blanking-line from Scan 2 are directly routed to the digital PCB. These signals are also available on the corresponding input-pins of the ST16960 to enable a loop-through in X-Y-Standby. In this mode the set has to behave like a cable between two Scan-modes. At the X-ray camera each input has a 50 Ω termination. A signal is generated out of the circuit around 74001.174020.5. This signal is connected to the XVB-line (bus) up to 74001.74003.1 and will become 'high', if there is a signal on pin 8 of Scan 2, or Scan 1. The detection of the input level on pin 8 of Scan 2 (VSC2) is done via an analog input of the CC-IP (lines then 20 means inactive, 4.5V for V1 determines a source with 16:9 picture-ratio and greater than 9.5V is an active 4:3 source).

All signals from the digital board ("D_F", "D_G", "D_B", "D_C", "D_Y" and "D_CVBS") are routed to the proper inputs of the STV6618 for amplification and driving purpose before they can be seen on the appropriate Scan outputs.

Parallel to this the "D_CVBS", and the "D_Y"-line are passing a 6 dB-amplifier and driver-IC [7410] and are then routed to the CVBS-Cinoh and Y/C-out rear. The chroma signal for this Y/C-out is coming from the STV6618 - which makes the 6 dB-amplification - and a driver [7406] in between.

The detection of the picture ratio information on the Y/C-input front is made by measuring the DC-level on the Chroma signal via analog input of the CC-up ("WSF-up-line"). In case the level is higher than 3.5V the input signal is a 16:9 source. If the level is lower than 3.5V the input signal is a 4:3 source. If the level is higher than 2.4V the picture ratio is 4:3.

For generation of the appropriate DC-voltage on the Y/C-out rear the "WSRO"-line is controlled via pin 18 of [7408] by the CC-μP (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

The control of the switching voltage (Pin 8 of S-Scan 1) is done via a 3-level-pin (nr.2) of the STV6618 [7408] and the transistors [7405], [7407] and [7409]. A "low" on pin 2 of [7408] causes around 11V on pin 8-S-Scan 1 (e.g. source with 4:3 picture-ratio active). Medium level (2.5V) on pin 2 of the STV6618 generates medium level (approx. 6V) on pin 8-S-Scan 1 (e.g. active source with 16:9) and a "high" on pin 2 of the STV6618 pushes pin 8-S-Scan 1 to "low" (e.g. inactive).

9.3.7 VPS/PDC- and Text-Datalsicor

For extraction of relevant information out of the video signal (time controlled recording, net-name-identification, time- & date- download) the STVS348 [7931] is used. Data transfer to the CC is fully done via I²C-bus and the input signal for

9.4.2 Audio routing

Audio IO NAFTA / APAC Overview

12.03.2002 Vers. 05

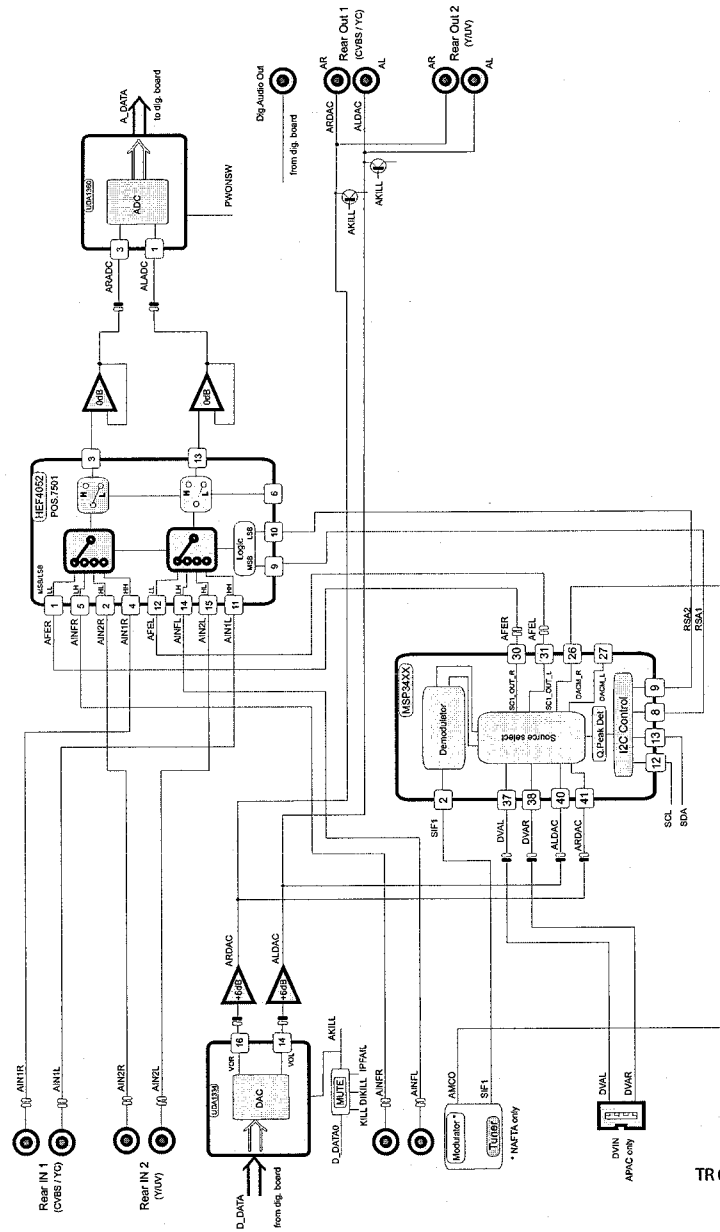
TR01057_001
170502

Figure 9-1

The complete Video-IO-switcher is basically realized by the matrix switch ST16618 [7408], which is controlled via I2C-bus by the CC-AU used outputs excluding pin 21 (VCVBS-REC). There is a 6dB-amplification and a 75 Ohm-driver-stage inside. The switcher is controlled by the CC-AU via the I2C-bus. The switching purpose on the analog board. The record selector inside the switch selects between the CVBS from front-end, the CVBS from Cech-Hier or Y from the S-Video-input rear. The signal from the S-Video-input rear is fed as a sub-signal to the CVBS output. The signal from the front end is one is one. The output signals of [7411] are fed as "A_VCVBS-" and "A_CVBS-" to the digital board for further processing.

To reduce the number of external inputs there is only one station for CVBS or Y/C (front and rear). The set automatically detects between the two inputs depending on the presence of a video signal (sync separator circuit on mP-sub-board) where Y/C has higher priority.

The YUV-inputs are directly routed to the digital PCB. Only the Y-line has to be present additionally on pin 4 of [7408] for video recognition.

The signals "D_CVBS" and "D_Y" are fed through [7408] (6dB amplification) and via [7406], [7408] used as driver to the S-Video output connector. The "D_CVBS" line is directly routed to the modulator and via the circuit around [7431] and [7432] amplified by 6dB before it is fed to the CVBS output plug.

The YUV signals from the digital board are also passing [7408] for 6dB amplification and driving purpose.

To achieve optimal picture quality the set is equipped with a complete YUV input and output stage. The complete YUV input and output stage is realized by the complete generation of the signal is done on the digital board and via a separate cable and connector [1946] the corresponding YUV lines are routed to the analog PCB. As there is only one YUV output available a switching between the YUV inputs is necessary. The switching is realized by the transitions [7421], [7422], [7423], [7424], [7427] and [7428] are used as driver for YUV progressive, [7423], [7428] and [7428] together with [7409] are necessary for driving these signals via the YUV output connector. The signal from the YUV input (PSCAN_XLL) line set to low. If progressive output is active the pins 27, 29 and 31 of [7408] are set to high impedance and "PSCAN_XLL" is also high (6 g. 5V).

The detection of the picture ratio information on the Y/C inputs (rear or front) is done by measuring the DC-level on the Chroma signal via an analog input of the CC-IP ("VSRF" and "VSRF-line"). In case the level is higher than 3.5V the input signal is a 16:9 source, if the level is lower than 2.4V the picture ratio is 4:3.

For generation of the appropriate DC-voltage on the Y/C output the "VSRD" line is controlled via pin 18 of [7409] by the CC-IP (Pin 18 set to low means 4:3, pin 18 set to high determines 16:9).

During Stand-By there is also no loop-through of any input to any output performed.

9.5 Digital Board

9.5.1 Record Mode

Video Part
Analog Video input signals CVBS, Y/C and U/V(RGB for EURO and YUV for USA) are routed via the analog board to connector 1601 and sent to IC7500 SAA7118 (Video Input Processor). Digital video input signals (DV_IN_DATA[7:0]) are sent from

the DVI-D board through the connector 1603 and further also to IC7500.

IC7500 (VIP) encodes the analog video to digital video and processes the digital video to 16-bit digital video stream. It also generates the digital video stream (CVBS, Y/C and U/V(RGB for EURO and YUV for USA)) and the digital video stream (SAAT7SH (EMPRESS)) and to IC7100 Versatile Stream Manager. The latter uses the data for VBI (vertical blanking interval) extraction.

IC7500 also encodes the digital video stream into a MPEG2 video stream that is fed to IC7100 (VSM).

Audio Part

I2S audio are sent from the analog board to IC7403 EMPRESS in connector 1602. The EMPRESS IC is fed by the I2S data into an AC3 audio stream which is fed to IC7100 (VSM).

Front-End I2S

IC7100 (VSM) interfaces directly to the different hardware modules used in the system. EMPRESS IC is fed by the I2S data into an AC3 audio stream which is fed to IC7100 (VSM). In IC7100 (VSM), the video MPEG2 stream and the audio AC3 stream are multiplexed into a PES packetized stream. The serial data are sent to the Basic Engine to be recorded.

Loop-Through

The multiplexed audio and video stream in the VSM is fed back via the parallel front-end interface to IC7200 (SIS505). This IC provides the I2S and serial data to the analog board. The serial data and audio signals are routed to the analog board via connectors 1601 and 1602. During recording, the recorded signal is present at the outputs of the analog board.

Playback Mode

During playback, the serial data from the Basic Engine is going directly to the SIS505 via the serial front-end I2S interface. The SIS505 is a MPEG & Audio/Video decoder and has the following outputs:

- analog video RGB, Y/C, CVBS
- RS audio (PCM format)
- S/PDIF audio (digital audio output)
- To external digital audio board:
- digital video YC27(0).

S2B Interface

The S2B interface between the VSM (IC7100) and the Basic Engine is controlled by the Basic Engine during record and playback mode.

System Clock

System clock (27MHz) of VSM, SIS505, EMPRESS and Programmable Scan are generated by oscillator 7905.

Audio Clock

During record mode, the audio clock ACC_ACLK_OSC is generated by IC7102 (PLL) because then the audio clock must be synchronized with the incoming video (VIF_705) from the VIF.

During playback mode, the audio clock ACC_ACLK_PLL is generated by the clock synthesizer IC7300 (M27035). The audio clock is fed to the IC7500 (VIP) and the IC7403 (EMPRESS) and the audio clock is fed to the VSM. The IC selects the appropriate clock to the SIS505. The EMPRESS IC derives from the incoming ACLK_BMP the I2S audio decoder clock AE_BCLK and AE_WCLK which are sent to the VSM.

9.5.6 ON/OFF

The digital board is not powered in standby mode. Control signal ION is sent to the analog board, will enable the PSU and the digital board.

- ION = High: the digital board is in powered down standby mode
- ION = Low: the power supply to the digital board is enabled

9.5.7 Reset

Control signal RESET_DIO, controlled by the microprocessor on the analog board is sent to the RESET LOGIC circuit.

- RESET_DIO = Low in standby mode
- RESET_DIO = High: the digital board is reset and the digital board is waked up.

9.5.8 I2C Bus

SIS505 is master of the I2C bus. The following IC's are connected to the I2C bus:

- IC7201 NVDRAM
- IC7403 EMPRESS
- IC7500 VIP
- IC7500 VSM
- IC7500 Video Postprocessor Line Doubler
- IC7501 ADV7198 Video Dec.

9.5.9 EMI Bus

The following IC's are connected to the External Memory bus:

- IC7301 and 7302: Flash memories which contain the application and diagnostic software
- IC7100: VSM
- IC7200: MPEG AV Decoder

9.5.10 Progressive Scan

Description:
The progressive scan part is integrated in the Digital Board and built around the SAGE FI2020 de-interlaser / line doubler (7701). This IC controlled de-interlacer uses a 64Mbit SDRAM (320k x 2M) to perform high quality deinterlacing (weaving). The output of the FI2020 is fed via a 7-poled line to the ST15058 (7200). The format of the digital YUV input to the SAGE E CORR59 with separated Hsync, Vsync and odd/even signal running on 27MHz.
The SAGE E CORR59 doesn't have a Vsync output the odd/even output of this IC has to be taken to extract the vertical sync. Some glue logic has been added to extract the vertical sync. The glue logic circuit consists of Flip-Flop IC 74HC74D (7701) and EXOR 74LC86 (7702). The next diagram shows how the vertical sync is extracted.

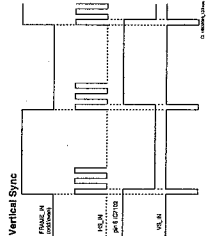


Figure 9-2

The output of the deinterlaser (FI2020 progressive video) is fed to the Analog Devices ADV7187 MacroVision compliant DEVC (7801).
The YUV current output of the DEVC is fed via a low pass filter to the SAGE E CORR59 (7800).
The analog video is fed via a 7-poled line to the analog board where the YUV 2PH clock connectors are located.

9.6 Divio Board

9.6.1 Short Description of the Module:

The Divio Module is a decoder for DV streams. The module is intended for the Philips DVDR1000032 on DVDH1000172 DVD-RW recorders. Input is a stream from a DV-camera or IEEE1394. Outputs are CoRRE59 Video and Analog audio (Analog audio is not used in this module).
The following picture shows the location of the Divio Module inside the DVDR set.

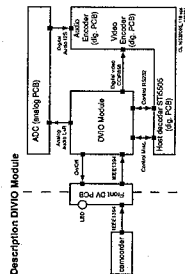


Figure 9-3

9.6.2 Block Diagram

Block Diagram DVIO

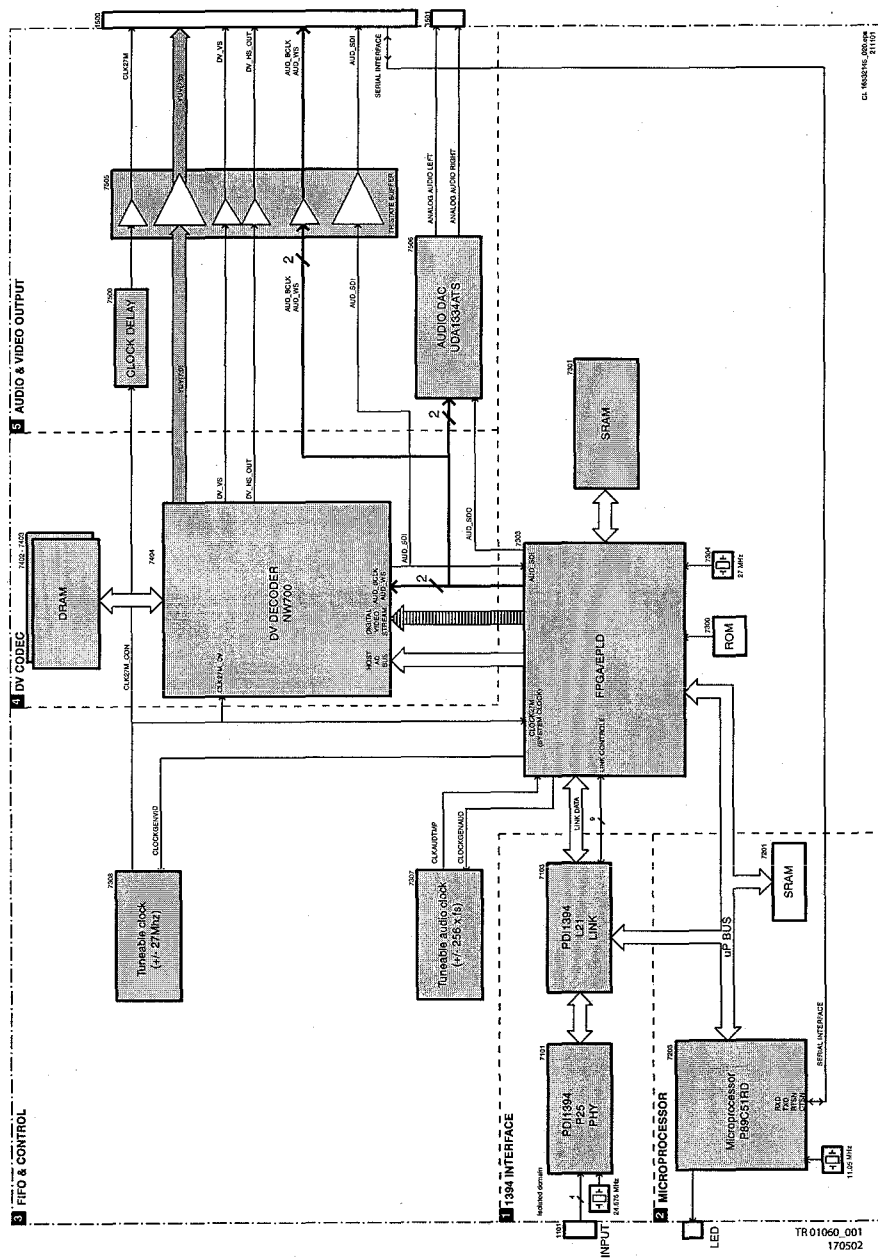
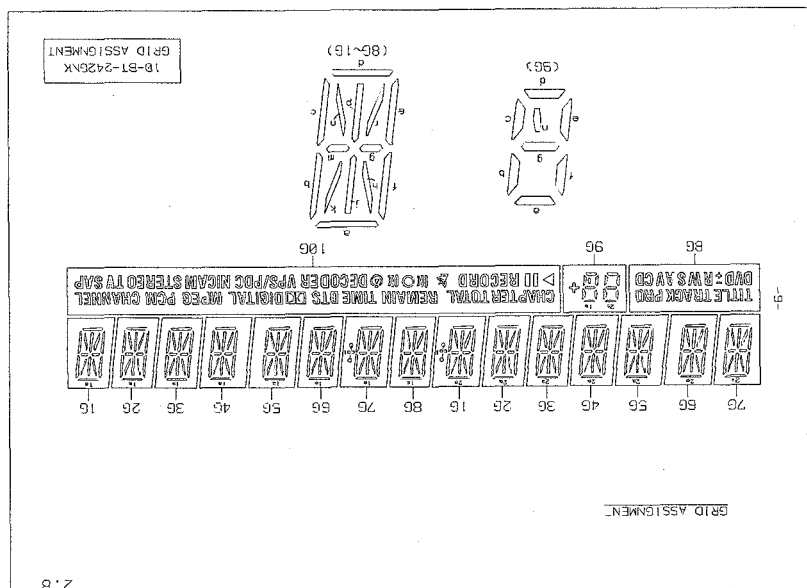
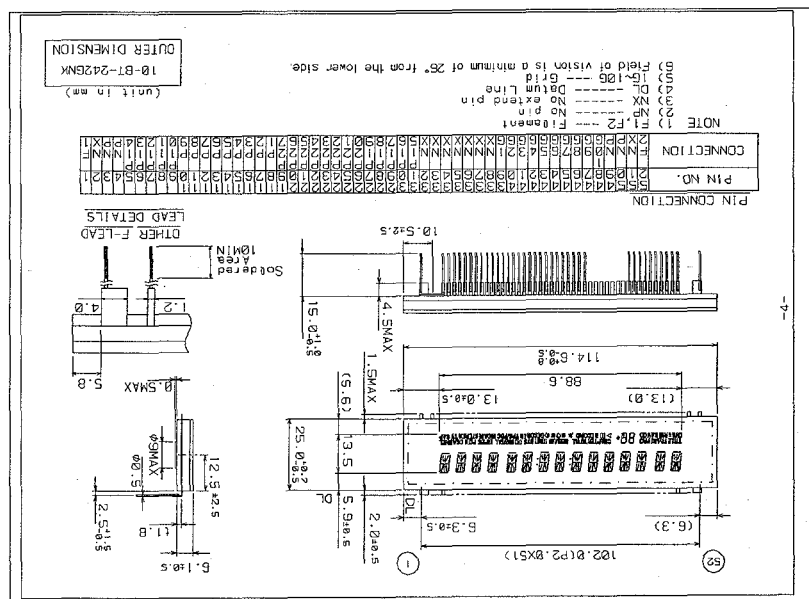


Figure 9-4

9.7 IC's Display Panel

9.7.1 IC7100



9.8 IC's Analog Board

9.8.1 ICT705

ANODE CONNECTION		19-BT-2426NK	
P1	19	19	19
P2	19	19	19
P3	19	19	19
P4	19	19	19
P5	19	19	19
P6	19	19	19
P7	19	19	19
P8	19	19	19
P9	19	19	19
P10	19	19	19
P11	19	19	19
P12	19	19	19
P13	19	19	19
P14	19	19	19
P15	19	19	19
P16	19	19	19
P17	19	19	19
P18	19	19	19
P19	19	19	19
P20	19	19	19
P21	19	19	19
P22	19	19	19
P23	19	19	19
P24	19	19	19
P25	19	19	19
P26	19	19	19
P27	19	19	19

PHILIPS Components Preliminary specification
VHF/UHF splitter-tuner UV1316K MK3



- FEATURES**
- Member of UV1300 MK3 family of small-sized UHF/VHF tuners
 - Integrated passive splitter
 - Systems CCIR, B/G, H, L, L', L and I, OIRT, D/K
 - Digitally-controlled (PLL) tuning via I²C-bus
 - Fast 400kHz I²C bus protocol compatible with 3.3V and 5V micro controllers
 - Off-air, S-cable and hyperband channels
 - World standardized mechanical dimensions and pinning. Horizontal mounting is optionally available.

DESCRIPTION

The UV1316K MK3 splitter - tuner belongs to the UV1300 MK3 family of small-sized tuners, to meet a wide range of TV applications. It is a full band tuner suitable for CCIR systems B/G, H, L, L', L and I. The low IF output impedance is designed for direct connection to a 50 ohm load. The tuner is also equipped with 2 two standard items, one a 5 level Analog Digital Converter and the other an internal wide band AGC with I²C selective TOP.

This tuner complies with the requirements of radiation, signal handling capability and immunity conforming to:

- CISPR 13 (1990) incl. amendment 1 (1992) and amendment 2 (1993) and CISPR 20
- European standards CENELEC EN55013, EN55020

MARKING

The following items of information are printed on a sticker that is on the top cover of the tuner:

- Type number
- Code number
- Origin letter of factory
- Change code
- Year and week code

ORDERING INFORMATION

TYPE	DESCRIPTION	ORDER NUMBERS
UV1316K/A I G -3	Asymmetrical IF output: IEC connector	3139 147 7701

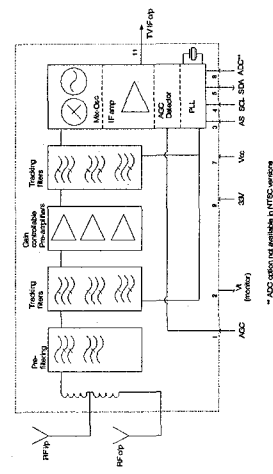
3139 149 10100

Rev 1: 10.10.2000

PHILIPS Components
VHF/UHF splitter-tuner
UV1316K MK3

Preliminary specification

BLOCK DIAGRAM



* ADC option not available in ITSC versions

PINNING		DESCRIPTION	
SYMBOL	PIN		
AGC	1	Gain Control Voltage	
TU	2	Tuning voltage	
AS	3	I ² C-Bus Address Select	
SCL	4	I ² C-Bus Serial Clock	
SDA	5	I ² C-Bus Serial Data	
n.c.	6	Not Connected	
V _i	7	PLL Supply Voltage +5V	
n.c./ADC	8	Not Connected / ADC Input ⁽¹⁾	
V _{tr}	9	Fixed tuning Supply Voltage +33V	
n.c.	10	Do not connect	
IF1	11	Asymmetrical IF Output	
GND	M1, M2, M3, M4	Mounting Taps (Ground)	



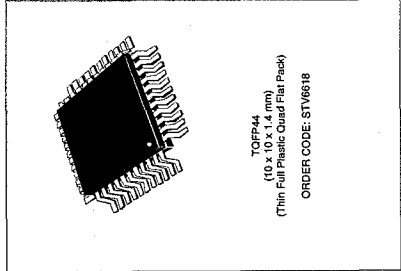
STV6618

VIDEO SWITCH MATRIX FOR DVD

TARGET SPECIFICATION

FEATURES

- PC Bus Control
- 5 Y/C/VBS Inputs, 3 Y/C/VBS Outputs
- 3 C Inputs, 1 C Output
- 2 RGB/Y/Pb Inputs, 1 RGB/Y/Pb Output
- 6 dB Gain on all 150 Buffers
- Integrated 150 Buffers
- Video Muting on all Outputs
- Bottom Clamp on all C/VBS/Y Average
- Clamp on C Inputs, Bottom Clamp on RGB, Sync-lip Clamp on Pb/Pb signals
- Bandwidth: 15 MHz
- Crosstalk: 50 dB



DESCRIPTION

The STV6618 is a highly integrated IC bus-controlled video switch matrix designed for use in digital video disc players, digital video disc players, and DVD players. It provides video routing required for connections to two external devices (Europe 2 SCARTs), internal tuners, digital encoders and recorders.

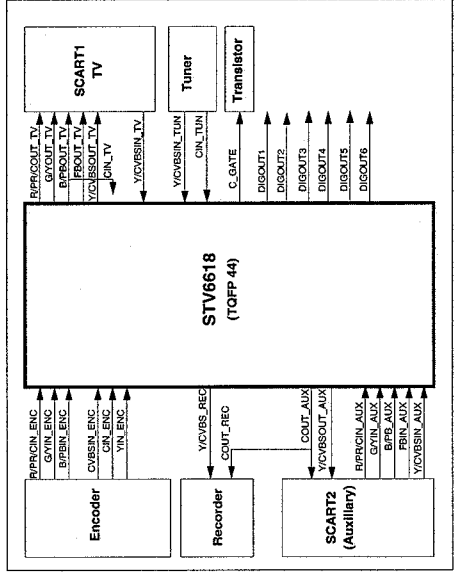
1.2 Pin Description

Pin No.	Symbol	Description
1	YCVBSIN_TUN	YCVBS Input from Tuner
2	DIGOUT3	Digital Output Pin 3
3	GND1	Ground Supply 1 for Video Inputs
4	CVBSIN_ENC	CVBS Input from Encoder
5	DECV	Video decoupling capacitor
6	CIN_ENC	Chroma Input from Encoder
7	YIN_ENC	Y Input from Encoder
8	Vcc	+4.5 V Power Supply for Video Inputs
9	R/PR/GRN_ENC	Red or Pr or Chroma Input from Encoder
10	GYIN_ENC	Green or Y Input from Encoder
11	B/PRIN_ENC	Blue or Pb Input from Encoder
12	GND2	Ground Supply 2 for Video Inputs
13	B/PRIN_AUX	Blue or Pb Input from Auxiliary (SCART2 or external Chrt)
14	DIGOUT4	Digital Output Pin 4
15	GYIN_AUX	Green or Y Input from Auxiliary (SCART2 or external Chrt)
16	DIGOUT5	Digital Output Pin 5
17	R/PRIN_AUX	Red or Pr or Chroma Input from Auxiliary (SCART2 or external Chrt)
18	DIGOUT6	Digital Output Pin 6
19	YCVBSIN_AUX	YCVBS Input from Auxiliary (SCART2 or external Chrt)
20	VCC2L_REG	Video Output Recorder Buffer Supply Pin
21	YCVBSOUT_REC	YCVBS Output to Recorder
22	GND3_REC	Ground Supply for Recorder Buffer
23	COUT_AUX	Chroma Output to Auxiliary (SCART2 or external Chrt)
24	VCCB1	Video Output Buffer Supply Pin
25	YCVBSOUT_AUX	YCVBS Output to Auxiliary (SCART2 or external Chrt)
26	GND6	Ground Supply for Video Buffer
27	B/PR/OUT_TV	Blue or Pb Output to TV (SCART1 or external Chrt)
28	C_GATE	External Transistor Command for Bidirectional SCART I/O
29	GY/OUT_TV	Green or Y Output to TV (SCART1 or external Chrt)
30	VCCB2	Video Buffer
31	R/PR/OUT_TV	Red or Pr or Chroma Output to TV (SCART1 or external Chrt)
32	VCCB3	Video Output Buffer Supply Pin
33	YCVBSOUT_TV	YCVBS Output to TV (SCART1 or external Chrt)
34	FR/OUT_TV	Fast Blanking Output to TV (SCART1)
35	FRIN_AUX	Fast Blanking Input from Auxiliary (SCART2)

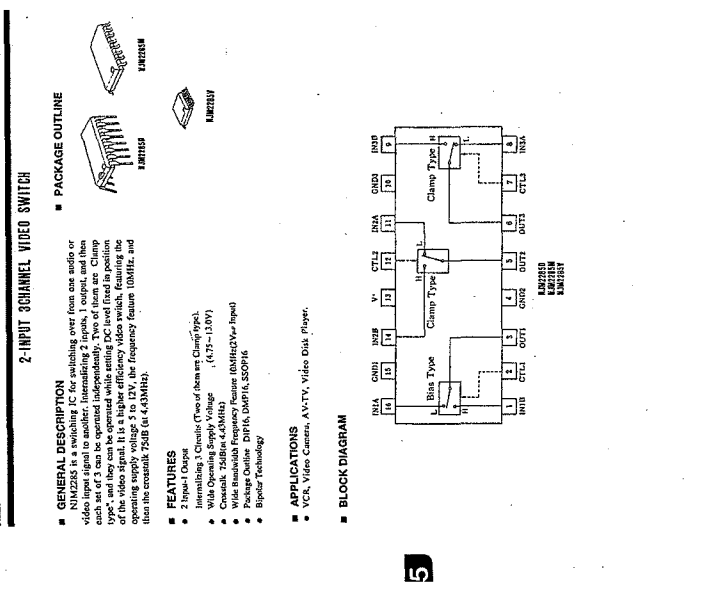
1.2 Pin Description

Pin No.	Symbol	Description
36	VDD	+4.5 V Digital Power Supply
37	SCL	IC Bus Clock
38	SDA	IC Bus Data
39	GND0	Digital Ground Supply
40	CIN_TV	Chroma Input from TV (SCART1 or external Chrt)
41	YCVBSIN_TV	YCVBS Input from TV (SCART1 or external Chrt)
42	DIGOUT1	Digital Output Pin 1
43	CIN_TUN	Chroma Input from Tuner
44	DIGOUT2	Digital Output Pin 2

Figure 2: STV6618 Input/Output Diagram



NJM2285



IC7313

GreenChip™II SMPS control IC

TEA1507

FEATURES

Distinctive features

- Universal mains supply operation (70 to 276 V AC)
- High level of integration, giving a very low external component count.

Green features

- Valley/zero voltage switching for minimum switching losses
- Efficient quasi-resonant operation at high power levels
- Frequency reduction at low power standby for improved system efficiency (<3 W)
- Burst mode operation for very low standby levels (<1 W)
- On-chip start-up current source.

Protection features

- Safe restart mode for system fault conditions
- Continuous mode protection by means of demagnetization detection (zero switch-on current)
- Accurate and adjustable overvoltage protection
- Short winding protection
- Undervoltage protection (foldback during overload)
- Overtemperature protection
- Low and adjustable overcurrent protection trip level
- Soft (re)start
- Mains voltage-dependent operation-enabling level.

APPLICATIONS

Besides typical application areas, i.e., TV and Monitor supplies, the device can be used in all applications that demand an efficient and cost-effective solution up to 250 W.

BLOCK DIAGRAM

TEA1507

Preliminary specification

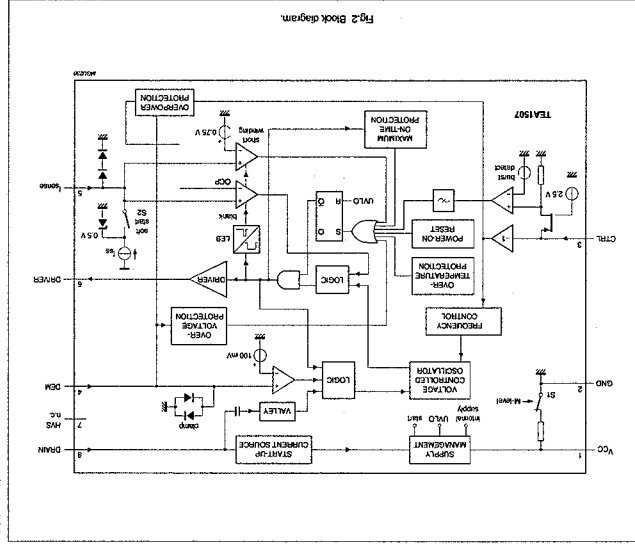


Fig. 2 Block diagram.

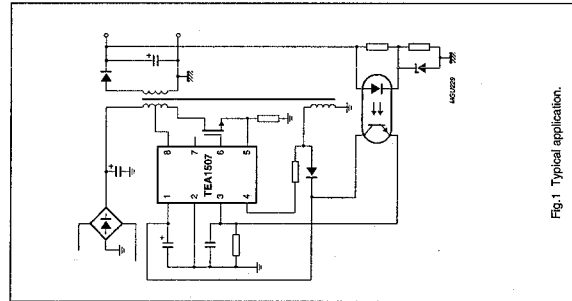


Fig. 1 Typical application.

IC7806

NCP300, NCP301

Voltage Detector Series

The NCP300 and NCP301 series are second generation ultra-low current voltage detectors. These devices are specifically designed for use as reset controllers in portable microprocessor based systems where extended battery life is paramount.

The NCP300 series consists of complementary output devices that are available with either an active high or active low reset output. The NCP301 series has an open drain N-channel output with either an active high or active low reset output.

The NCP300 and NCP301 device series are available in the SO-23-5 package with seven standard under voltage thresholds. Additional thresholds that range from 0.9 V to 4.9 V in 100 mV steps can be manufactured.

The NCP300 series consists of complementary output devices that are available with either an active high or active low reset output. The NCP301 series has an open drain N-channel output with either an active high or active low reset output.

The NCP300 and NCP301 device series are available in the SO-23-5 package with seven standard under voltage thresholds. Additional thresholds that range from 0.9 V to 4.9 V in 100 mV steps can be manufactured.

Features

- Quiescent Current of 0.5 μ A Typical
- High Accuracy Under Voltage Threshold of 2.0%
- Wide Operating Voltage Range of 0.8 V to 10 V
- Complementary or Open Drain Reset Output
- Active Low or Active High Reset Output

Typical Applications

- Microprocessor Reset Controller
- Low Battery Detection
- Power Fail Indicator
- Battery Backup Detection



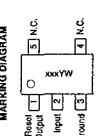
ON Semiconductor

http://onsemi.com



THIS SO-23-5 PACKAGE IS COMPLIANT WITH JEDEC CASE 483

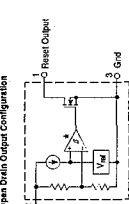
PIN CONNECTIONS AND MARKING DIAGRAM



ORDERING INFORMATION

See included ordering and shipping information in the marketing information section on page 25 of this data sheet.

Complementary Output Configuration



The device contains 25 active transistors.

Figure 1. Representative Block Diagrams

NCP300, NCP301

OPERATING DESCRIPTION

The NCP300 and NCP301 series devices are second generation ultra-low current voltage detectors. They are designed for use as reset controllers in portable microprocessor based systems where extended battery life is paramount.

Initially consider that input voltage V_{IN} is at a nominal level and it is greater than the voltage detector upper threshold (V_{UTR}) and the reset output (pin 1) will be in the high state for active low devices, or in the low state for active high devices. If there is a power transient and V_{IN} becomes

output to be in the low state for active low devices, or in the high state for active high devices. After completion of the power transient, V_{IN} will return to its nominal level and becomes greater than the V_{UTR} . The voltage detector has built-in hysteresis to prevent erratic reset operation as the comparator threshold is crossed.

Although these device series are specifically designed for use as reset controllers in portable microprocessor based systems, they can be used in other applications where precise voltage monitoring is required. Figure 22 through Figure 29 shows various application examples.

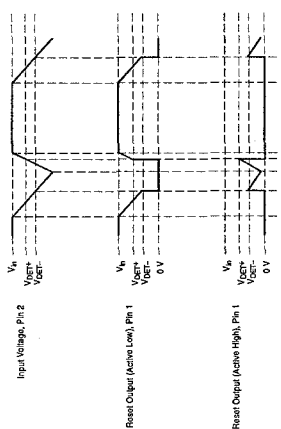


Figure 21. Timing Waveforms

VERSATILE STREAM MANAGER

GENERAL DESCRIPTION

The Versatile Stream Manager (VSM) is an ASIC used in the first generation DVD Video Recorder. Main function of the VSM is to route data selectively to the different hardware modules such as Basic Engine, MPEG encoder and MPEG decoders and buffering the data streams that are coming from or going to these hardware modules.

The VSM provides a host interface to support one 4M*16 SDRAM device. A host interface allows the VSM CPU to directly access this memory and the VSM internal registers.

Handling of data streams is done using scatter / gather DMA so under software control. Hardware support is provided in the VSM to support software MPEG AV multiplexing.

FEATURES

The VSM features include:

- SDRAM memory interface to support one 4 banks*1M*16 (64Mbit) SDRAM device.
- Glueless Host Interface for STM S ST15505.
- Glueless MPEG Decoder interface for STM S ST15505.
- Glueless interface to Philips SAA6750 MPEG Video Encoder or SAA6752 MPEG AV Encoder.
- Glueless interface to Motorola DSP56362 used as MPEG Audio Encoder.
- Glueless interface to Philips HDR65 as part of Basic Engine Interface including the Sector Processor as also included in the ST15505.
- Audio Clock Control providing PLL loop and clock lock detection.
- Double Extraction of VBI decoded data from extended CCIR 656 stream.
- Double UART with hardware handshake and 8 byte Rx/Tx FIFO.
- Generation of additional Host Bus to support Audio Encoder DSP56362.
- Descriptor based DMA Controllers for data stream handling.
- Hardware support for software MPEG multiplex process.
- Internal Interrupt Controller to handle internal and 4 external interrupt sources.
- Operates from single 27 MHz clock input.
- JTAG for production tests.
- 3.3V logic core.
- 3.3V / 5V operation IO pins.
- 208 PIN LQFP Package. (cutew9)

BLOCK DIAGRAM

Figure 2.1 shows the block diagram of the VSM. The hardware blocks can be divided in to three categories:

- three categories:
- General modules: Host Interface, Memory Interface, Interrupt Controller.
 - DMA Controllers.
 - Functional Interfaces; the link between the actual external hardware interface and the DMA Controller. Some Functional Interfaces have knowledge about the stream coming through in order to perform for example MPEG stream characteristics extraction and insertion.

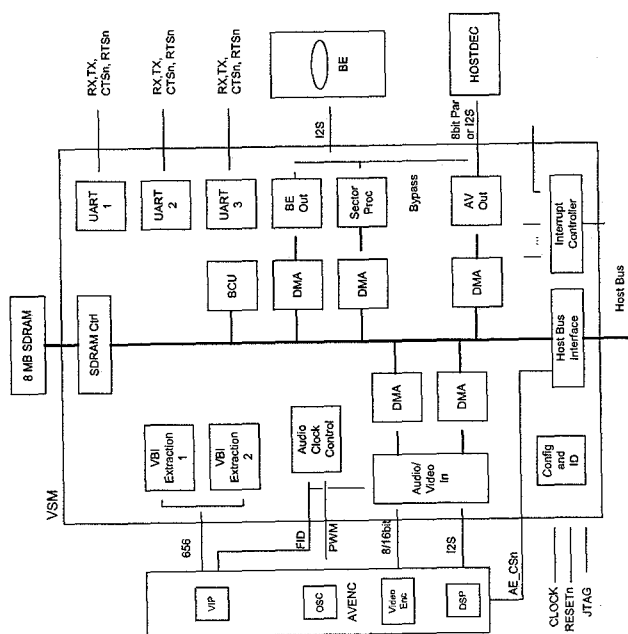


Figure 2.1: VSM Overview

PINNING

OVERVIEW

Name	Pins	Type	Function
System			
RESETn	1	In	
SYSClk (27MHz)	1	In	
Host Interface			
HO_A(21:1)	21	In	
HO_D(15:0)	16	In/Out	
HO_BEN(1:0)	2	In	
HO_RWn	1	In	
HO_CSLn	1	In	
HO_CSHn	1	In	
HO_A22	1	In	
HO_WAIT	1	Out	
HO_PROCClK	1	In	
Memory Interface			
M_A(13:0)	14	Out	
M_Dq(15:0)	16	In/Out	
M_RASn	1	Out	
M_CASn	1	Out	
M_WEn	1	Out	
M_LDQm	1	Out	
M_UDQm	1	Out	
M_CLKOUT	1	Out	
M_CLKEN	1	Out	
Basic Engine Interface			
BE_BCLK	1	In	
BE_DAT1	1	In	
BE_WCLK	1	In	
BE_SYNC	1	In/Out	
BE_FLAG	1	In	
BE_V4	1	In	
BE_DAT0	1	Out	
Video Encoder Interface			
VE_D(15:0)	16	In	
VE_DS0n	1	Out	
VE_DTACKn	1	In	
VE_VIP_ERROR	1	In	Signal coming from SAA7114
Audio Encoder Interface			
AE_CSn	1	Out	
AE_BCLK	1	In/Out	(CR157/CR157)
AE_WCLK	1	In/Out	(CR157/CR157)
AE_DATA	1	In	(CR157)

Decoder Interface			
D_PAR_D(7:0)	8	Out	
D_PAR_DVALID	1	Out	
D_PAR_STR	1	Out	
D_PAR_REQ	1	In	
D_PAR_SYNC	1	Out	
D_WCLK	1	Out	
D_V4	1	Out	
Audio Clock Control			
ACC_FID	1	In	(G6200)
ACC_PWM	1	Out	
ACC_ACLK_OSC	1	In	
ACC_ACLK_DAI	1	In	
ACC_ACLK_PLL	1	In	
ACC_ACLK_DEC	1	Out	
VBI Extractor			
VBI_IPD(7:0)	8	In	
VBI_ICLK	1	In	
UART 1			
UART1_RX	1	In	
UART1_TX	1	Out (OC)	
UART1_CTSn	1	In	
UART1_RTSn	1	Out (OC)	
UART 2			
UART2_RX	1	In	
UART2_TX	1	Out (OC)	
UART2_CTSn	1	In	
UART2_RTSn	1	Out (OC)	
UART 3 (user)			
UART3_RX	1	In	
UART3_TX	1	Out	
UART3_CTSn	1	In	
UART3_RTSn	1	Out	
Interrupt Controller			
EXTINT(3:0)	4	In	From: VEnc, AEnc, BE, VSync (ST15505)
CPUNIT(1:0)	2	Out (OC)	
JTAG			
TCK	1	In	Boundary Scan
TDI	1	In	
TDO	1	Out/Z	
TMS	1	In	
TRStn	1	In	
Test			
TEST0	1	In	Amsal Test
TEST1	1	In	
Power Supply			
VDD	20	Power	10% of total pins package
VSS	20	Power	10% of total pins package
Total Pins	208		

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer

The SAA6752HS/02 is intended for customers whose application does not require the DDCE function.

- application does not require the DDCS function.
- The SAA6792HS gives significant advantages to customers developing digital recording applications:
- **Fast time-to-market and low development resources:** By adding a simple external video input processor (AC audio analog-to-digital converter, and an external digital-to-analog converter), the SAA6792HS can accept any MPEG-2 video and MPEG-1 layer 2 or AC-3 audio streams, multiplexed into a single program or transport stream for transmission to various storage devices, multiplexed into a connection to various streaming servers or broadcast channels. Making design effort for our customers a minimum, as well as removing the need for in-depth experience in MPEG encoding.
 - **Low system host resources:** All video and audio encoding algorithms are implemented on an external MPEG-2 processor. The SAA6792HS only requires minimal host participation from system host software. Host software can be implemented in C or C++ and control required recording parameters via I2C-bus.

22 Application Fields

- ### 2.2.1 DVD BASED OPTICAL DISC RECORDERS (DVD+RW, DVD-RW, DVD-RAM)

Emerging optical disc based recording systems target to replace the existing consumer recording (VCR) and recordable DVD and VCD products. The first generation recordable DVD based products will want to maximise recording times for the 4.7 Gbyte storage capacity. For these systems the SAA6752HS is critical, with its superior noise filtering and motion estimation, in enabling high quality, at low bit rates.

Playback compatibility with existing DVD decoding solutions will also be important, which is why the SAA6752HS provides Dolby® digital consumer (AC-3) audio encoding to allow playback through existing players implementing DDCE (AC-3) decoding dominant in current DVD platforms.

The DVD stream is based on MPEG Program Stream (PS). The SAA6752HS directly outputs MPEG PS compliant to the DVD standard.

- (1) MIPS is a registered trademark of MIPS Technologies.

MPEG-2 video and MPEG-audio/AC-3 encoder with multiplexer

- 6 Output Interface**
 - Parallel interface 8-bit master/slave output
 - 3-state output port
 - Guiseless interfacing with IEEE 1384 chip sets (for example, PDI 1394 L11)
- 7 Control domain**
 - All control done via I²C-bus
 - I²C-bus slave transceiver up to 400 MHz
 - I²C-bus slave address select pin
 - Host interrupt flag pin.
- 8 Other features**
 - Single external clock or single crystal 27 MHz
 - Separate 27 MHz system clock output
 - Interface voltage 3.3 V
 - TTL compatible digital outputs
 - Power supply voltage 3.3 and 2.5 V
 - Boundary Scan Test (BST) supported
 - Power-down mode
 - Single SRAM system memory (16 Mbit or 64 Mbit config).

GENERAL DESCRIPTION

1 General

Philips Semiconductors' second generation real-time MPEG-2 encoder, the SA46752N, is a highly integrated chip audio and video encoding solution with very high performance and low power consumption. It provides full multiplexing functionality. Within its flexible architecture, users can choose to encode either in real time or in batch mode. The SA46752N also provides a wide range of technical features for consumer video encoding, noise filtering, deinterlacing, and motion estimation. We have pushed the boundaries for video quality even further, providing enhanced quality for low bit rates and enabling extended recording times for a wide range of applications. The SA46752N also enables a key driver for new consumer digital recording applications; system cost reduction. By integrating all video encoding and multiplexing functionality we will be moving from a three chip to a one chip system, with cost savings of 30% or more. This is a significant design and process technology, thus providing a very low cost, high quality encoding system.

MPEG-2 video and MPEG-audio/AC-3 audio



- FEATURES**

 1. Video input and preprocessing
 - Digital YUV input according to "ITU-R BT.656" (8 bits at 27 MHz) and "ITU-R BT.601"
 - Support of enhanced "ITU-R BT.656"-input format containing decoded VBI data residue via I-CBUS
 - Support of digital video signals according to ITU-R BT.601 and CCIR 601 (CCIR) and CCIR 656 (WSS)
 - Support of digital video signals according to SMPTE 170M and SMPTE 296M (Color Management System (CMS))
 - Management system (CGMS)
 - Processing of four broadcast video signals from analog
 - Audiotext generation: 250/384 × 1, (48 kHz) locked to video frame rate (in principle)
 - Video freeze-in (in principle)
 - Sample-and-hold (locked to video frame rate)
 - Internal-to-chip mode operation of modes except Internal Versatile Dec (DVD) compatible broadcast.

VCM according to IEC 758

- Dolby®11 Digital Consumer Encoding (DCEC) also known as AC-3P 2 channel audio encoding at 352 kbps or 384 kbps (only for SAA6752/5501) or MPEG-1 layer 2 audio only encoding at 256 kbps/101 kbps
- Input data bypass for Linear Pulse Code Modulation (LPCM) and compressed audio data (MPEG-1, MPEG-2, Dolby Digital (DD) and Digital Theatre Systems (DTS)) according to IEC 61937
- Preamble P1, Preamble P2 and bit stream information captured for identification of modes in DCEC, compressed audio data (MPEG-2, DD and DTS) and DCEC 43337
- Audio mode as PC-bus control for all modes except DVD-compliant bypass

supported at all modes

- Multiplexing of video and audio streams according to file format
- MPEG-2 systems standard ("ISO 13818")
- MPEG-2 systems standard ("ISO 13818")
- Generation of output of MPEG-2 Transport Streams (TS), MPEG-2 Program Streams (PS), Packetized Elementary Streams (PES) and Elementary Streams (ES) compliant to the DVD, D-VHS and DV standards
- MPEG time stamp (PTS/DTS)/GOP/PCH generation and insertion (synchronization)
- Insertion of metadata
- Generation of empty time slots for subsequent insertion on specific class data
- Optional recording of user data in the GOP header and in the picture header.

- Two digital I²S input ports for selection between two digital audio sources

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer SAA6752HS

2.2.2 HDD BASED TIME SHIFT RECORDING
Hard Disc Drive (HDD) based time-shift systems enable Personalized TV (PTV) functionality, providing consumers with new powers of control over what and when to watch broadcast content. With the audio and video content recorded digitally, identification, search and retrieval becomes a 'no brainer' task as compared to traditional VCR functionality. Combine this with electronic program guides and intelligent control, and the PTV can also analyse the viewers watching habits to search for programs likely to be of interest and automatically recorded in anticipation of the viewers preferences. Since HDD recorders are closed systems, the recording format stream can be proprietary. SAA6752HS flexible stream formats for HDD including MPEG Transport Stream (TS) or MPEG Packetized Elementary Stream (PES).

2.2.3 DIGITAL VCR (DVHS) RECORDING
A DVHS player records streams based on MPEG Transport Streams (TS) packed in logical tape tracks. The SAA6752HS output streams are compliant with DVHS standard requirements.

2.2.4 VIDEO EDITING/TRANSMISSION/SURVEILLANCE/CONFERRING
The SAA6752HS can operate as a stand-alone device in all above applications. The SAA6752HS full features and flexibility allows customers to tailor functionality and performance to specific application requirements. All required control settings such as GOP size and bit rate modes can be selected via PC-bus.

3 QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V _{DDP}	digital supply voltage (pad coils)	3.0	3.3	3.6	V
V _{DDO}	digital supply voltage (core)	2.3	2.5	2.7	V
V _{DDA}	analog supply voltage (oscillator and PLL)	2.3	2.5	2.7	V
I _{DDO}	analog + digital supply current	407	463	525	mA
P _{TOT}	total power dissipation	1.2	1.4	1.9	W
f _{QF}	quartz frequency (digital controlled tuning)	27 × (1 - 200 × 10 ⁻⁵)	27	27 × (1 + 200 × 10 ⁻⁵)	MHz
f _{SDRAM}	SDRAM clock frequency	—	108	—	MHz
f _{PC}	PC-bus input clock frequency	100	—	400	MHz
B	output bit-rate	1.5	—	25	Mbits
V _{IT}	HIGH-level digital input voltage	1.7	—	3.6	V
V _{IL}	LOW-level digital input voltage	-0.5	—	+0.7	V
V _{OH}	HIGH-level digital output voltage	V _{DDP} - 0.4	—	V _{DDP}	V
V _{OL}	LOW-level digital output voltage	0	—	0.4	V
T _{amb}	ambient temperature	0	—	70	°C

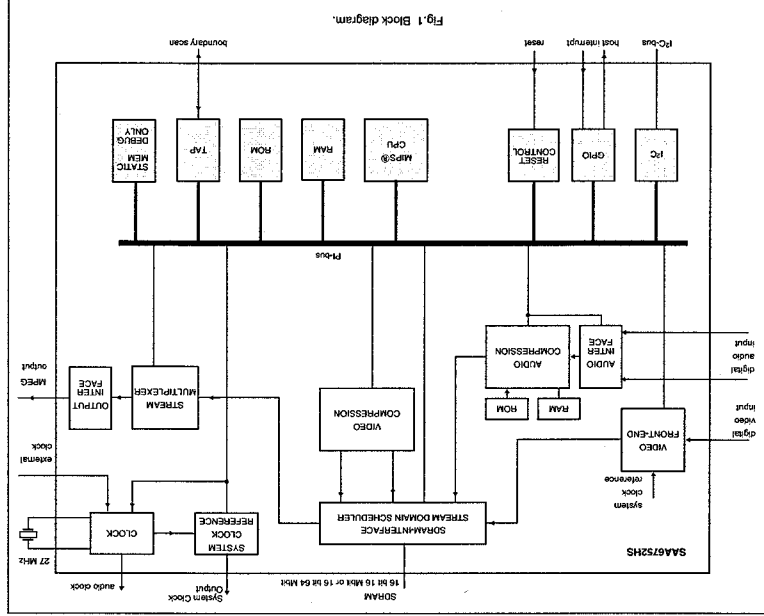
4 ORDERING INFORMATION

PACKAGE		
TYPE NUMBER	NAME	DESCRIPTION
SAA6752HS01(1)	SQFP208	plastic shrink quad 7ai package; 208 leads (lead length 1.3 mm);
SAA6752HS02(2)		body 28 × 28 × 3.4 mm; high stand-off height

- Notes
1. MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer.
 2. MPEG-2 video and MPEG-audio encoder with multiplexer, but without AC-3 audio encoder.

MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer SAA6752HS

5 BLOCK DIAGRAM



MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

6 PINNING			
SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	DESCRIPTION
V _{SS}	1	ground	—
SDATA1	2	input	— I ² S-bus serial data input port 1 with internal pull-down resistor
SCLK1	3	input/output	— I ² S-bus serial clock port 1 with internal pull-down resistor
SW61	4	input/output	— I ² S-bus word select port 1 with internal pull-down resistor
V _{DDP}	5	supply	— pad ring supply voltage (3.3 V)
SDATA2	6	input/output	— I ² S-bus serial data input port 2 with internal pull-down resistor
SCLK2	7	input/output	— I ² S-bus serial clock port 2 with internal pull-down resistor
SW62	8	input/output	— I ² S-bus word select port 2 with internal pull-down resistor
ACLK	9	output	— audio clock output (256 × f _i or 384 × f _i)
V _{SS}	10	ground	—
IDQ	11	input	— reserved (recommended connect to pin V _{SS}) with internal pull-down resistor
YUV0	12	input	— video input signal bit 0 (LSB)
YUV1	13	input	— video input signal bit 1
YUV2	14	input	— video input signal bit 2
YUV3	15	input	— video input signal bit 3
YUV4	16	input	— video input signal bit 4
YUV5	17	input	— video input signal bit 5
YUV6	18	input	— video input signal bit 6
YUV7	19	input	— video input signal bit 7 (MSB)
V _{SS}	20	ground	—
HSYNC	21	input	— horizontal sync input (video) with internal pull-down resistor
VSYNC	22	input	— vertical sync input (video) with internal pull-down resistor
FID	23	input	— video ?id identification input (odd/even ?id) with internal pull-down resistor
VCLK1	24	input	— video clock input 1 (27 MHz) with internal pull-down resistor
VSSCO	25	ground	— core ground
VSSCO	26	ground	— core ground
VSSCO	27	supply	— core supply voltage (2.5 V)
VSSCO	28	supply	— core supply voltage (2.5 V)
VDDP	29	supply	— pad ring supply voltage (3.3 V)
VCLK2	30	input	— video clock input 2 (27 MHz) with internal pull-down resistor
PDOAV	31	3-state output	— parallel stream data output for audio/video identifier
PDOIS	32	input	— parallel stream data input for data strobe (request for packet in Data Expander Bus interface (DEBI) slave mode) with internal pull-up resistor
PDOISYNC	33	3-state output	— parallel stream data output for packet sync
VSSP	34	ground	— pad ground
PDOVAL	35	3-state output	— parallel stream data valid output with internal pull-up resistor
PDOO	36	3-state output	— parallel stream data output bit 0 (LSB)

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MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
PDO1	37	3-state output	4	parallel stream data output bit 1
PDO2	38	3-state output	4	parallel stream data output bit 2
VDDP	39	supply	—	pad ring supply voltage (3.3 V)
PDO3	40	3-state output	4	parallel stream data output bit 3
PDO4	41	3-state output	4	parallel stream data output bit 4
PDO5	42	3-state output	4	parallel stream data output bit 5
PDO6	43	3-state output	4	parallel stream data output bit 6
VSSP	44	ground	—	pad ground
PDO7	45	3-state output	4	parallel stream data output bit 7 (MSB)
PDOCLK	46	input/output	4	parallel stream clock input/output
PCADDRESS	47	input	—	I ² C-bus address select input with internal pull-up resistor
SD_DQ15	48	input/output	8	SDRAM data input/output bit 15 (MSB)
VDDP	49	supply	—	pad ring supply voltage (3.3 V)
SD_DQ0	50	input/output	8	SDRAM data input/output bit 0 (LSB)
SD_DQ14	51	input/output	8	SDRAM data input/output bit 14
SD_DQ1	52	input/output	8	SDRAM data input/output bit 1
VSSP	53	ground	—	pad ground
SD_DQ13	54	input/output	8	SDRAM data input/output bit 13
SD_DQ2	55	input/output	8	SDRAM data input/output bit 2
SD_DQ12	56	input/output	8	SDRAM data input/output bit 12
VDDP	57	supply	—	pad ring supply voltage (3.3 V)
SD_DQ3	58	input/output	8	SDRAM data input/output bit 3
SD_DQ11	59	input/output	8	SDRAM data input/output bit 11
SD_DQ4	60	input/output	8	SDRAM data input/output bit 4
SD_DQ10	61	input/output	8	SDRAM data input/output bit 10
VSSP	62	ground	—	pad ground
SD_DQ5	63	input/output	8	SDRAM data input/output bit 5
SD_DQ9	64	input/output	8	SDRAM data input/output bit 9
SD_DQ6	65	input/output	8	SDRAM data input/output bit 6
SD_DQ8	66	input/output	8	SDRAM data input/output bit 8
VDDP	67	supply	—	pad ring supply voltage (3.3 V)
SD_DQ7	68	input/output	8	SDRAM data input/output bit 7
SD_DQ1	69	output	8	SDRAM data mask enable output bit 1
SD_DQ10	70	output	8	SDRAM data mask enable output bit 0 (LSB)
SD_WE	71	output	8	SDRAM write enable output (active LOW)
VSSP	72	ground	—	pad ground
SD_CS	73	output	8	SDRAM column address strobe output (active LOW)
SD_CLK	74	output	8	SDRAM clock output
SD_RAS	75	output	8	SDRAM row address strobe output (active LOW)
SD_CKE	76	output	8	SDRAM clock enable output

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MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
V _{SSCO}	77	ground	—	core ground
V _{SSCO}	78	ground	—	core and substrate ground
V _{DDCO}	79	supply	—	core supply voltage (2.5 V)
V _{DDCO}	80	supply	—	core supply voltage (2.5 V)
V _{DDCO}	81	supply	—	core supply voltage (2.5 V)
SD_CS	82	output	8	SDRAM chip select output (active LOW)
SD_A13	83	output	8	SDRAM address output bit 13 (bank selection for 64 Mbit)
SD_A9	84	output	8	SDRAM address output bit 9
SD_A8	85	output	8	SDRAM address output bit 8
V _{SSP}	86	ground	—	pad ground
SD_A11	87	output	8	SDRAM address output bit 11 (bank selection for 16 Mbit)
SD_A7	88	output	8	SDRAM address output bit 7
SD_A12	89	output	8	SDRAM address output bit 12 (bank selection for 64 Mbit)
SD_A6	90	output	8	SDRAM address output bit 6
V _{DDP}	91	supply	—	pad ring supply voltage (3.3 V)
SD_A10	92	output	8	SDRAM address output bit 10
SD_A5	93	output	8	SDRAM address output bit 5
SD_A0	94	output	8	SDRAM address output bit 0 (LSB)
SD_A4	95	output	8	SDRAM address output bit 4
V _{SSP}	96	ground	—	pad ground
SD_A1	97	output	8	SDRAM address output bit 1
SD_A3	98	output	8	SDRAM address output bit 3
SD_A2	99	output	8	SDRAM address output bit 2
SD_DQM3	100	output	8	reserved (do not connect)
V _{DDP}	101	supply	—	pad ring supply voltage (3.3 V)
SD_DQM2	102	output	8	reserved (do not connect)
SD_DQ31	103	input/output	8	reserved (do not connect)
SD_DQ16	104	input/output	8	reserved (do not connect)
V _{SSP}	105	ground	—	pad ground
SD_DQ30	106	input/output	8	reserved (do not connect)
SD_DQ17	107	input/output	8	reserved (do not connect)
SD_DQ29	108	input/output	8	reserved (do not connect)
V _{DDP}	109	supply	—	pad ring supply voltage (3.3 V)
SD_DQ18	110	input/output	8	reserved (do not connect)
SD_DQ28	111	input/output	8	reserved (do not connect)
SD_DQ19	112	input/output	8	reserved (do not connect)
SD_DQ27	113	input/output	8	reserved (do not connect)
V _{SSP}	114	ground	—	pad ground
SD_DQ20	115	input/output	8	reserved (do not connect)
SD_DQ26	116	input/output	8	reserved (do not connect)

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
V _{SSCO}	77	ground	—	core ground
V _{SSCO}	78	ground	—	core and substrate ground
V _{DDCO}	79	supply	—	core supply voltage (2.5 V)
V _{DDCO}	80	supply	—	core supply voltage (2.5 V)
V _{DDCO}	81	supply	—	core supply voltage (2.5 V)
SD_CS	82	output	8	SDRAM chip select output (active LOW)
SD_A13	83	output	8	SDRAM address output bit 13 (bank selection for 64 Mbit)
SD_A9	84	output	8	SDRAM address output bit 9
SD_A8	85	output	8	SDRAM address output bit 8
V _{SSP}	86	ground	—	pad ground
SD_A11	87	output	8	SDRAM address output bit 11 (bank selection for 16 Mbit)
SD_A7	88	output	8	SDRAM address output bit 7
SD_A12	89	output	8	SDRAM address output bit 12 (bank selection for 64 Mbit)
SD_A6	90	output	8	SDRAM address output bit 6
V _{DDP}	91	supply	—	pad ring supply voltage (3.3 V)
SD_A10	92	output	8	SDRAM address output bit 10
SD_A5	93	output	8	SDRAM address output bit 5
SD_A0	94	output	8	SDRAM address output bit 0 (LSB)
SD_A4	95	output	8	SDRAM address output bit 4
V _{SSP}	96	ground	—	pad ground
SD_A1	97	output	8	SDRAM address output bit 1
SD_A3	98	output	8	SDRAM address output bit 3
SD_A2	99	output	8	SDRAM address output bit 2
SD_DQM3	100	output	8	reserved (do not connect)
V _{DDP}	101	supply	—	pad ring supply voltage (3.3 V)
SD_DQM2	102	output	8	reserved (do not connect)
SD_DQ31	103	input/output	8	reserved (do not connect)
SD_DQ16	104	input/output	8	reserved (do not connect)
V _{SSP}	105	ground	—	pad ground
SD_DQ30	106	input/output	8	reserved (do not connect)
SD_DQ17	107	input/output	8	reserved (do not connect)
SD_DQ29	108	input/output	8	reserved (do not connect)
V _{DDP}	109	supply	—	pad ring supply voltage (3.3 V)
SD_DQ18	110	input/output	8	reserved (do not connect)
SD_DQ28	111	input/output	8	reserved (do not connect)
SD_DQ19	112	input/output	8	reserved (do not connect)
SD_DQ27	113	input/output	8	reserved (do not connect)
V _{SSP}	114	ground	—	pad ground
SD_DQ20	115	input/output	8	reserved (do not connect)
SD_DQ26	116	input/output	8	reserved (do not connect)

MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

SAA6752HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
SD_DQ21	117	Input/output	8	reserved (do not connect)
SD_DQ25	118	Input/output	8	reserved (do not connect)
V _{DDP}	119	supply	—	pad ring supply voltage (3.3 V)
SD_DQ22	120	Input/output	8	reserved (do not connect)
SD_DQ24	121	Input/output	8	reserved (do not connect)
SD_DQ23	122	Input/output	8	reserved (do not connect)
EXTCLK	123	Input	—	27 MHz external clock input with internal pull-up resistor
V _{SSP}	124	ground	—	pad ground
V _{SSA}	125	ground	—	oscillator analog ground
XTALI	126	analog input	—	crystal oscillator input (27 MHz); note 2
XTALO	127	analog output	—	crystal oscillator output (27 MHz)
V _{DDA}	128	supply	—	oscillator analog supply voltage (2.5 V)
V _{SSC}	129	ground	—	core ground
V _{SSC}	130	ground	—	core ground
V _{DDC}	131	supply	—	core supply voltage (2.5 V)
V _{DDC}	132	supply	—	core supply voltage (2.5 V)
V _{DDP}	133	supply	—	pad ring supply voltage (3.3 V)
TDI	134	Input	—	boundary scan test data input; pin must be set to HIGH during normal operating; with internal pull-up resistor; note 3
TMS	135	Input	—	boundary scan test mode select; pin must be set to HIGH during normal operating; with internal pull-up resistor; note 3
TCK	136	Input	—	boundary scan test clock; pin must be set to LOW during normal operating; with internal pull-up resistor; note 3
TDO	137	3-state output	4	boundary scan test data output; pin not active during normal operating; with 3-state output; note 3
V _{SSP}	138	ground	—	pad ground
TRST	139	Input	—	test reset input (active LOW), for boundary scan test (with internal pull-up); notes 3 and 4
CLKOUT	140	Output	4	27 MHz system clock output
TEST0	141	Input/output	4	reserved (do not connect)
TEST1	142	Input/output	4	reserved (do not connect)
V _{DDP}	143	supply	—	pad ring supply voltage (3.3 V)
TEST2	144	Input/output	4	reserved (do not connect)
SDA	145	Input/output-drain output	—	serial data input/output (I ² C-bus)
SCL	146	Input/output-drain output	—	serial clock input/output (I ² C-bus)
RESET	147	Input	—	reset input (active LOW); with internal pull-up resistor
V _{SSP}	148	ground	—	pad ground
RTS	149	output	4	reserved (do not connect); Universal Asynchronous Receiver/Transmitter (UART) request to send output (active LOW)

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MPEG-2 video and MPEG-audio/AC-3 audio
encoder with multiplexer

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SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
CTS	150	Input	—	reserved (recommended connect to pin V _{DDP}); UART clear to send input; external static memory select input (active LOW); with internal pull-up resistor
RXD	151	Input	—	reserved (recommended connect to pin V _{DDP}); UART receive data; internal boot select input; with internal pull-up resistor
TXD	152	Output	4	reserved (do not connect); UART transmit data
V _{DDP}	153	supply	—	pad ring supply voltage (3.3 V)
SM_UB	154	Input/output	4	reserved (do not connect)
SM_LB	155	Input/output	4	reserved (do not connect)
H_LIF	156	3-state output	4	host interrupt 2ag output; with internal pull-up resistor
V _{SSP}	157	ground	—	pad ground
SM_OE	158	Output	4	reserved (do not connect); static memory output enable output (active LOW)
SM_A9	159	Output	4	reserved (do not connect); static memory address output bit 9
SM_A10	160	Output	4	reserved (do not connect); static memory address output bit 10
V _{DDP}	161	supply	—	pad ring supply voltage (3.3 V)
SM_A8	162	Output	4	reserved (do not connect); static memory address output bit 8
SM_A11	163	Output	4	reserved (do not connect); static memory address output bit 11
SM_A7	164	Output	4	reserved (do not connect); static memory address output bit 7
SM_A12	165	Output	4	reserved (do not connect); static memory address output bit 12
V _{SSP}	166	ground	—	pad ground
SM_A6	167	Output	4	reserved (do not connect); static memory address output bit 6
SM_A13	168	Output	4	reserved (do not connect); static memory address output bit 13
SM_A5	169	Output	4	reserved (do not connect); static memory address output bit 5
SM_A14	170	Output	4	reserved (do not connect); static memory address output bit 14
V _{DDP}	171	supply	—	pad ring supply voltage (3.3 V)
SM_WE	172	Output	4	reserved (do not connect); static memory write enable output (active LOW)
SM_D7	173	Input/output	4	reserved (do not connect); static memory data input/output bit 7 with internal pull-down resistor
SM_D8	174	Input/output	4	reserved (do not connect); static memory data input/output bit 8 with internal pull-down resistor
SM_D6	175	Input/output	4	reserved (do not connect); static memory data input/output bit 6 with internal pull-down resistor
V _{SSP}	176	ground	—	pad ground
SM_D9	177	Input/output	4	reserved (do not connect); static memory data input/output bit 9 with internal pull-down resistor
SM_D5	178	Input/output	4	reserved (do not connect); static memory data input/output bit 5 with internal pull-down resistor
SM_D10	179	Input/output	4	reserved (do not connect); static memory data input/output bit 10 with internal pull-down resistor

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MPEG-2 video and MPEG-audio/AC-3 audio encoder with multiplexer SAA6762HS

SYMBOL	PIN	INPUT/OUTPUT ⁽¹⁾	I _{max} (mA)	DESCRIPTION
SM_D4	180	input/output	4	reserved (do not connect), static memory data input/output bit 4 with internal pull-down resistor
V _{ssco}	181	ground	—	internal pre-driver and substrate ground
V _{ssco}	182	ground	—	core ground
V _{ssco}	183	supply	—	core supply voltage (2.5 V)
V _{ssco}	184	supply	—	internal pre-driver supply voltage (2.5 V)
V _{ssco}	185	supply	—	pad ring supply voltage (3.3 V)
SM_D11	186	input/output	4	reserved (do not connect), static memory data input/output bit 11 with internal pull-down resistor
SM_D3	187	input/output	4	reserved (do not connect), static memory data input/output bit 3 with internal pull-down resistor
SM_D12	188	input/output	4	reserved (do not connect), static memory data input/output bit 12 with internal pull-down resistor
SM_D2	189	input/output	4	reserved (do not connect), static memory data input/output bit 2 with internal pull-down resistor
V _{ssp}	190	ground	—	pad ground
SM_D13	191	input/output	4	reserved (do not connect), static memory data input/output bit 13 with internal pull-down resistor
SM_D1	192	input/output	4	reserved (do not connect), static memory data input/output bit 1 with internal pull-down resistor
SM_D14	193	input/output	4	reserved (do not connect), static memory data input/output bit 14 with internal pull-down resistor
SM_D0	194	input/output	4	reserved (do not connect), static memory data input/output bit 0 (LSB) with internal pull-down resistor
V _{ssp}	195	supply	—	pad ring supply voltage (3.3 V)
SM_D15	196	input/output	4	reserved (do not connect), static memory data input/output bit 15 (MSB) with internal pull-down resistor
SM_CS3	197	output	4	reserved (do not connect), static memory chip select output for external ROM or RAM (active LOW)
SM_A4	198	output	4	reserved (do not connect), static memory address output bit 4
SM_A3	199	output	4	reserved (do not connect), static memory address output bit 3
V _{ssp}	200	ground	—	pad ground
SM_A2	201	output	4	reserved (do not connect), static memory address output bit 2
SM_A15	202	output	4	reserved (do not connect), static memory address output bit 15
SM_A1	203	output	4	reserved (do not connect), static memory address output bit 1
SM_A16	204	output	4	reserved (do not connect), static memory address output bit 16
V _{ssp}	205	supply	—	pad ring supply voltage (3.3 V)
SM_A0	206	output	4	reserved (do not connect), static memory address output bit 0 (LSB)
SM_A17	207	output	4	reserved (do not connect), static memory address output bit 17 (MSB)
SM_CS6	208	output	4	reserved (do not connect)

IC77005-FLI2200

FLI2200

Description

The FLI2200 is a single chip implementation of Faroudja Laboratories' award winning deinterlacing and post-processing algorithms that produce the highest quality progressive video output from a variety of interlaced video inputs including 525/60 (NTSC) or 625/50 (PAL or SECAM). It uses patented and patent pending motion-adaptive blending techniques to produce the original frame rate of 30 or 25 frames per second and perfect interlacing of 3.2 and 2.2 pulldown for film-base sources, including continuous monitoring and compensation for bad edits that occur frequently in broadcast material due to poor scene cuts or insertion of commercials. Video material is processed by a set of content-sensitive spatio-temporal filters that adapt to the appropriate direction for smoothest interpolation using the patented Faroudja DCI™ algorithm. The FLI2200 also includes motion-adaptive cross-color suppression that removes highly objectionable coloration artifacts produced by commonly used video decoders. Its internal processing uses 10 bits per channel to maintain the highest quality but also supports a 4-bit channel for low cost applications. The FLI2200 can be configured to output 4 MB of low cost SDRAM for best quality deinterlacing, but it can also be operated in an optimized intra-field mode without memory for more cost-sensitive applications. This makes possible the use of a single design for both high-end and low-end applications. The FLI2200 integrates a number of functions to provide maximum flexibility in a low cost configuration. This includes an on-chip clock generator, SDRAM controller, display controller, input and output color-space converters. It uses a standard 2-wire serial control interface for easy control and access to the registers. The FLI2200 can be connected without glue logic to the FLI2000 video decoder and FLI2220 Enhancer and OSD Generator to produce the highest quality video pipeline for premium applications. It is also fully compatible with other decoders having a ITU-R BT 656 output format.

Applications

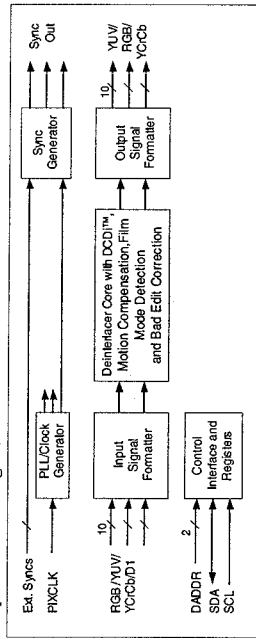
Flat panel TV - LCD, PDP
Progressive scan TVs
Multimedia front/rear projectors
Home Theater
Scan Converters
Multimedia PCs/Workstations

DCDI™ is a Faroudja trademark

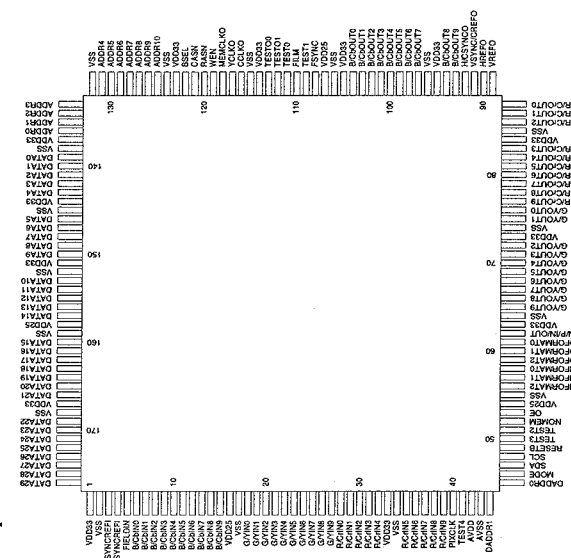
Features

Motion-adaptive cross-color suppression removes artifacts produced by improper Y/C separation in low-cost video decoders
Motion-adaptive video deinterlacing selects optimal filtering on a per-pixel basis
Film-mode for proper handling of 3.2 and 2.2 pulldown material
Bad-edit detection/correction compensates for poor scene cuts and insertions common in broadcast material
Motion-weighted interpolation for video sources produces maximum resolution without introducing motion artifacts
Directional Correlational Deinterlacing (DCDI™) minimizes jaggies on angled lines
8/10-bit Y/Cb/Cr (Y) (ITU-R BT 656), 16/20-bit Y/Cb/Cr (ITU-R BT 601), 24/30-bit RGB or Y/Cb/Cr/YPrPb interlaced input options
7 Supports 525/60 (NTSC), 625/50 (PAL/SECAM)
7 Accepts up to 1100 pixels/line
8/10-bit, 16/20-bit YUV, 24/30-bit RGB or Y/Cb/Cr/YPrPb progressive output options
Supports 8- or 10-bit inputs and outputs
10-bit internal processing for highest quality
Includes color-space converters at input and output for maximum flexibility
Auto-detection of NTSC/PAL/SECAM inputs
High-order filtering produces smooth chroma output in 4:2:2 to 4:4:4 or 4:4:4 to 4:2:2 conversions
Resolution recovery maximizes output signal-to-noise ratio and dynamic range
Can be operated without glue logic with FLI2000 Video Decoder and FLI2220 Enhancer and OSD Generator ICs to produce highest quality video pipeline
Glue-less interface to most standard video decoders
Built-in display timing generator
On-chip clock generator eliminates external PLLs
On-chip SDRAM controller
Uses low cost SDRAM as field memory - 4 MB
Optimized intra-field operation allows memory-less configuration for lowest cost applications with same design and layout as for high-end applications
2-wire serial control interface for easy control
176-pin TQFP package

Simplified Block Diagram



Pin description



Pin #	Name	Description
52	NOMEM	No Memory Mode control input. This pin controls the operation of the FL12200 as follows: When this pin is set low the device is used with external field memories and operates in the full set of demultiplexing modes, i.e., motion adaptive video demultiplexing and full frame film source demultiplexing using 3:2 pulldown detection (2:2 pulldown for 625/59 sources). When this pin is set high the FL12200 is forced into the intra-field only demultiplexing mode, which requires no external memories, allowing the FL12200 to be used in low-cost applications where the ultimate video quality is not critical. The pin is active low. The pin is set high during the power-on sequence. This can be overridden by the NM0Vr bit 1 in the register 05 _h , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 05 _h for details.
27-18	GYN ₀₋₉	10-bit green or luminance signal input bus. The mode is set by the IFORMAT ₂₋₀ pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _h , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _h for details. This signal is sampled on the rising edge of PIXCLK.
15-6	BCIN ₀₋₉	10-bit blue or Cr chroma signal input bus. The mode is set by the IFORMAT ₂₋₀ pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _h , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _h for details. Bits 6, 4 and 3 in register 00 _h specify the buses used in the multiplexed modes. In all cases the signals are sampled on the rising edges of PIXCLK. In the YCbCr and YPbPr modes the Cr or Pb signal is sampled on alternate rising edges of PIXCLK in 4:2:2 mode. The frequency of PIXCLK will be 27 MHz in the multiplexed YCbCr mode and 15.5 MHz in all other modes. These pins should be tied low when not used.
39-35 32-28	R/CH ₀₋₉	10-bit red or Cr chroma signal input bus. The mode is set by the IFORMAT ₂₋₀ pins. This can be overridden by the IFmtOvr bit, bit 3 in register 00 _h , allowing this function to be set or changed via the I ² C bus. Please refer to the description of register 00 _h for details. Bits 6, 4 and 3 in register 00 _h specify the buses used in the multiplexed modes. In all cases the signals are sampled on the rising edges of PIXCLK. In the YCbCr mode the Cr signal is sampled on alternate rising edges of PIXCLK in 4:2:2 mode. The frequency of PIXCLK will be 27 MHz in the multiplexed YCbCr mode and 15.5 MHz in all other modes. These pins should be tied low when not used.
3	HSYNCRFB	Horizontal sync or reference. The horizontal sync or reference of the input signal should be connected to this pin. The function is programmed with bit 4 in register 00 _h . The polarity and position of the sync or reference pulse relative to the start of active video are both programmable within a small range. When the FL12200 is used in the TU-R BT 601/D input mode with embedded syncs (Frame = 110) this input is not used and should be tied low. In this case all sync information will be derived from the signal.
4	VSYNCRFB	Vertical sync or reference. The vertical sync or reference of the input signal should be connected to this pin. The function is programmed with bit 4 in register 00 _h . The polarity and position of the sync or reference pulse relative to the start of active video are both programmable within a small range. When the FL12200 is used in the TU-R BT 601/D input mode with embedded syncs (Frame = 110) this input is not used and should be tied low. In this case all sync information will be derived from the signal.
5	FLDIN	Field identifier input. The field identifier output of the source signal should be connected to this pin. A low setting signifies an even field and a high level signifies an odd field. When bit 4 in register 00 _h is set low, the input timing is based on HREF and VREF and this signal is required. When this bit is set high the input timing is based on HSYNC and VSYNC and this signal is generated internally and is not required. When bit 5 in register 06 is set high this signal is also used as the frame boundary identifier for 30 Hz film sources.

Pin Connections and Functions

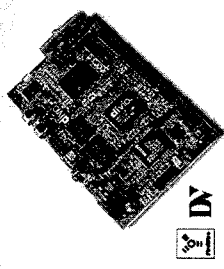
Pin #	Name	Description
See list	V _{SS}	Ground connections. Connect to the digital ground plane. Pins: 2, 17, 34, 55, 64, 74, 85, 96, 106, 115, 124, 132, 138, 145, 152, 159, 168
See list	V _{D003}	Pad Ring digital power connections. Connect to the digital 3.3 volt power supply and decouple to the digital ground plane. Pins: 1, 33, 63, 73, 84, 95, 105, 114, 123, 137, 144, 151, 167
See list	V _{D005}	Core Logic digital power connections. Connect to the digital 2.5 volt power supply and decouple to the digital ground plane. Pins: 16, 54, 107, 158
43	AV _{SS}	Ground connection for the clock PLL circuit. Connect to the digital ground plane
42	AV _{DD}	Analog power connections for the clock PLL circuit. Connect to a separately decoupled 2.5 volt power supply and decouple directly to the AV _{SS} pin.
49	RESETB	Reset. When this input is set low it will reset all the internal registers to the default states. Refer to the section on the control registers for details of these states. The device must be reset after it is powered up.
53	OE	When this pin is set high the outputs of the FL12200 will be enabled, when it is set low the outputs will be set into a high-impedance state.
56-58	IFORMAT ₂₀	Input signal format control. The settings of these pins set the format of the input signal. This can be overridden by the IFmtOvr bit, bit 3 in register 07 ₁₀ , allowing this function to be set or changed via the IFC bus. Please refer to the description of register 07 ₁₀ for details.
59-61	OFORMAT ₁₀	Output signal format control. The settings of these pins set the format of the output signal. This can be overridden by the OFmtOvr bit, bit 3 in register 07 ₁₀ , allowing this function to be set or changed via the IFC bus. Please refer to the description of register 07 ₁₀ for details.
44-45	DADDR ₁₀	The settings of DADDR ₁₀ allow the device address of the control bus to be programmed to prevent conflict with the other devices connected to the bus. DADDR ₁₀ allow the device address to be set to any of the following values: 00C ₁₀ , C2C ₁₀ , E0E ₁₀ , E2E ₁₀ . Please refer to the section "Control Bus Operation and Protocol" for further information.
46	MODE	When this pin is set low the control bus will operate in the slave mode, allowing the device to be programmed from an external controller. When it is set high the FL12200 will set up an external IFC memory connected to the bus. Please refer to the "Control Bus Operation and Control Protocol" section for more details.
47	SDA	2-wire serial control bus data. Data can be written to the control registers via this pin when it is in the input mode and data can be read from the control registers when it is in the output mode. Refer to the section on the serial port for timing and format details and to the section on the registers for programming information.
48	SCL	2-wire serial control bus clock. When the control port operates in slave mode this pin will be an input and when it operates in the self programming mode it will be an output.
40	PIXCLK	Pixel clock input. This clock is used to drive all the circuits in the FL12200. An internal PLL is used to unconvert this clock to provide the master clock signal and other clocks used internally. Note that when the FL12200 is used in the D1 input mode the PIXCLK input should run at the rate of two cycles per pixel (one for luma and one for chroma).
62	NIPIN/OUT	NTSC/PAL input or output. The default function of this pin is NTSC/PAL signal indicator output. When the input video signal is a 525 line signal this pin will be set high and when it is a 625 line signal the pin is set low. This function of this pin can be programmed to be an input according to the setting of this pin if the NPOp ₁₀ bits, bits 5-4 in register 03 ₁₀ , are set to 00 ₁₀ , overriding the internal line counter. I.e., it will treat the signal as a 525 line signal when it is set high and a 625 line signal when it is set low.

Pin #	Name	Description
65-72 75-76	GYOUT ₁₀	Green or luminance output bus. In the RGB mode this output is the Green signal and in the YCbCr mode it is the Y signal. The mode is set by the OFORMAT ₁₀ pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07 ₁₀ , allowing this function to be set or changed via the IFC bus. Please refer to the description of register 07 ₁₀ for details. The signal is clocked on to the falling edge of YCLKO.
93-94 97-104	B/CHOUT ₁₀	Blue or Cr chrominance output bus. In the RGB mode this output is the Blue signal, in the Y Ch Cr mode it is the Ch signal. The mode is set by the OFORMAT ₁₀ pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07 ₁₀ , allowing this function to be set or changed via the IFC bus. Please refer to the description of register 07 ₁₀ for details. The busses used in the multiplexed modes are set by means of bit 5 in register 08 ₁₀ . The signal is clocked out on the falling edge of YCLKO in the RGB and YUV 4:4:4 modes, on the falling edge of YCLKO prior to the next rising edge of CCLKO in the YUV 4:2:2 mode, and on the rising edge of MEMCLKO in the multiplexed YCbCr (pseudo D1) mode.
77-83 86-88	R/COUT ₁₀	Red or Cr chrominance output bus. In the RGB mode this output is the Red signal, in the YCbCr mode it is the Cr signal. The mode is set by the OFORMAT ₁₀ pins. This can be overridden by the OFmtOvr bit, bit 3 in register 07 ₁₀ , allowing this function to be set or changed via the IFC bus. Please refer to the description of register 07 ₁₀ for details. The busses used in the multiplexed modes are set by means of bit 5 in register 08 ₁₀ . The signal is clocked out on the falling edge of YCLKO in the RGB and YUV 4:4:4 modes, on the falling edge of MEMCLKO in the multiplexed YCbCr (pseudo D1) mode.
116	CCLKO	Chroma output sampling clock. This clock is derived from PIXCLK and will be at half the frequency of YCLKO. In 30-bit 4:2:2 output mode the chroma output signals will change on the falling edge of YCLKO prior to the next rising edge of this clock.
117	YCLKO	Luma output sampling clock. This clock is derived from PIXCLK and is double the frequency of PIXCLK. In 30-bit and 20-bit output modes the output signals will change on the falling edge of this clock.
89	VREF0	Start of active field or frame indicator. This signal goes high to indicate the first active line in each field or frame and goes low during the vertical blanking interval. The polarity and timing of this signal are programmable.
90	HREF0	Start of active line indicator output. This signal goes high to indicate the first active pixel in each line and goes low during the horizontal blanking interval. The polarity and timing of this signal are programmable.
91	VSYNC/CREFO	Vertical sync output. This signal provides the vertical sync function for the outputs. Its polarity is programmable to be active high or active low. It can also be programmed to be a composite reference for applications requiring this instead of sync.
92	HCSYNCO	Horizontal or composite sync output. This signal provides the horizontal sync function for the outputs. Its polarity is programmable to be active high or active low. This signal can also be programmed to be the composite sync output, CSYNC.
108	FSYNC	Film mode sync output. When film mode is detected this pin will toggle in sync with the 3.2 (NTSC) or 2.2 (PAL) and 30Hz film in NTSC) pulldown sequence detected in the source.
110	FILM	Film mode detector output. This pin will be set high when the FL12200 detects that the video input was converted from 24 fps film with a telecine machine. If film mode is not detected this pin will be set low.

Pin #	Name	Description
125-131 133-136	ADDR _{10A}	SDRAM Address bus. This signal bus is used to address the external SDRAM(s) used for field memories. It should be connected to the A _{10B} bus of the memory chip(s). Please refer to the Applications section of this data sheet for further details.
176-169 166-160	DATA ₃₆₋₀	SDRAM Data bus. This signal bus is used to transfer the data to and from the external SDRAM(s) used for field memories. It should be connected to the DQ ₃₆₋₀ bus of the memory chip when using a 64 Mbit SDRAM. When using two 16 Mbit SDRAMs this 30-bit bus may be connected to the two 16-bit data buses of the memories in two ways: either connect 16 lines to one chip and 14 to the other, or connect 15 to both. In all cases the two unused data lines on the memory chip(s) should be connected to ground via 22 k Ω resistors. Please refer to the Applications section of this data sheet for further details.
118	MEMCLKO	SDRAM clock and 2x output sampling clock. This clock is derived from PIXCLK and will be at double the frequency of YCLKO. This active signal should be connected to the CLK pin(s) on the SDRAM(s). When the 10-bit output mode selected the output signals will also change at this clock rate and this should then be used as the output clock.
119	WEN	SDRAM Write Enable. This active low signal should be connected to the WE pin(s) on the SDRAM(s).
120	RASN	SDRAM Row Address Select. This active low signal should be connected to the RAS pin(s) on the SDRAM(s).
121	CASN	SDRAM Column Address Select. This active low signal should be connected to the CAS pin(s) on the SDRAM(s).
122	BSEL	SDRAM Bank Select. When using two 16 Mbit SDRAMs this signal should be connected to the BA (also called BS or A ₁₁) pin on both SDRAMs. When using a 64 Mbit SDRAM this signal should be connected to the BA0 (also called BS0 or A ₁₁) pin on the SDRAM and BA1/BS1 (also called BA when BA0 is referred to as A ₁₁) should be tied low.
41, 50, 51, 100, 111	TEST ₁₋₀	These pins are used for test purposes only and should always be tied low for normal operation.
112, 113	TESTO ₁₋₀	These pins are test outputs and should be left unconnected in normal operation.

9.11 IC's Divio Board

9.11.1 IC7404: NW700



NW700
DV Decoder
Daymon Beach
Reference Solution

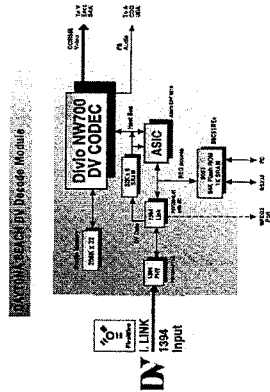
9.11.1.1 Divio NW700 Reference Solution

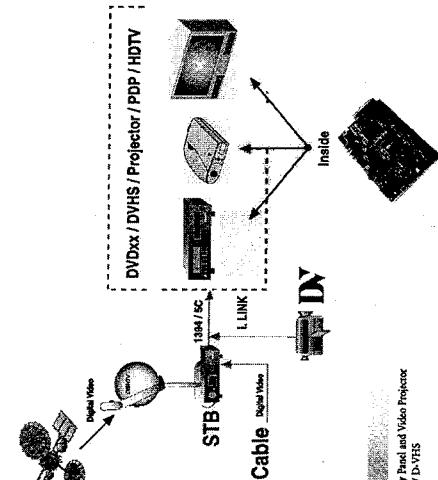
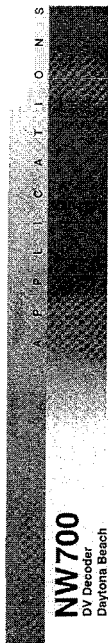
divio introduces the NW700, the world's first single-chip DV decoder. Fully DVD compliant and designed with divio's patented pending compression technology, the NW700 delivers unrivaled video quality, performance and compatibility. With a single-chip design and guided interface to standard video components, divio's single chip DV decoder will replace current multi-chip solution and enable a new generation of cost-effective digital video consumer products.

divio has created the "Daymon Beach" reference solution that includes the NW700, Philips Semiconductor's PD1394LXN audio/video 1394 LINK layer controller and PD1394PIA 200 MHz/vec PHY divio provides a complete easy to integrate DV/IEEE1394 solution to OEMs to reduce time-to-market and development costs.

The NW700 provides an unprecedented feature-set that deliver real-time DV decoding functions to empower the next generation of consumer electronics devices.

- Enhanced Feature set**
- Fully DVD Compliant
 - Automatic Audio and AUX Code Processing
 - Pin compatible with NW701 (DV CODEC)
 - Low System Cost
 - Integrated single-chip design including AV processing and audio processing
 - Queue interface to Video Encoder (GA711), Audio Encoder (UDA1340), Micro-controller, and memory
 - Integrated shuffle memory logic
 - Requires only one 256K x 32 EDO DRAM
- Real-time Performance**
- High speed (33Mbytes/s throughput)
 - 5Mbits double clock speed for dual stream applications
- Video and Audio Support**
- Compressed video output and PS
 - Audio output
 - Support NTSC and PAL
 - Selectable Audio channel (AB or CD)
 - 48, 44.1, and 32KHz (12 and 16-bit) audio support
- Simple Host Bus connectivity**
- 8 or 16-bit asynchronous host bus interface
 - built-in 512 byte DV FIFO
 - Three interrupt pins for enhanced system control





Applications
 Plasma Display Panel and Video Projector
 Digital VCR / D-VHS
 DVD-RAM
 Digital Set-top-box
 HDTV

DVDR880-890/0X1 Block Reference Kit

- Board Components**
- divio NW700 - DV Decoder
 - 601 iC (F88C1R02)
 - 100p FPG423L x 8 SRAM
 - IEEE1394 LINK (PD1394LX)
 - IEEE1394 PHY (PD1394P1A)
 - 256 x 32 EDO Memory

- Manufacturing Kit Contents**
- Daytona Beach Reference Design
 - Schematics, Gerber Files and BOM
 - Technical Documents and Manuals
 - PCBA and Firmware Source Code

- Ordering Information**
- | Part Number | Description |
|---------------|-------------------|
| NW700LQ | DV Decoder |
| Daytona Beach | Manufacturing Kit |

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9.12 List of Abbreviations

Digital Board

- +12V
- +12V Power Supply
- +2V5_FLI
- +2V5 Power Supply for FLI
- +2V5_PLL
- +2V5 Power Supply for PLL
- +3V3
- +3V3 Power Supply
- +3V3 ANA
- +3V3 ANA Supply Analogue
- +3V3_DD
- +3V3 Power Supply Digital
- +3V3_FLI
- +3V3 Power Supply for FLI
- +5V
- +5V Power Supply
- +5V_BUFFER
- +5V Power Supply for Video Filters
- 5900_HS
- Horizontal Synchronization from Host Decoder to Progressive Scan
- 5908_ODD_EVEN
- Odd - Even control from Host Decoder to Progressive Scan
- 5V
- 5V Power Supply
- 5V_BUFFER
- 5V Power Supply for Video Filters
- ALMPRESS(130)
- ALMPRESS output to SDRAM
- ACC_ACLK_OG
- Audio Clock PLL output sync with incoming video for record
- ACC_ACLK_PLL
- Audio Clock PLL output for play back
- EMPRESS
- EMPRESS audio clock output
- AD_ACLK
- Audio Decoder Clock
- AD_ACLK
- Audio Encoder I2S bit clock
- AD_DATAO
- Audio Decoder Output data (PCM)
- AD_SHPDS3
- Audio Decoder output to the analog board
- AD_WCLK
- Audio Decoder I2S word clock
- AE_ACLK
- Audio Encoder Clock
- AE_ACLK_OEN
- Audio Encoder Clock Output Enable
- AE_BCLK
- Audio Encoder I2S bit clock
- AE_BCLK_VSM
- Audio Encoder I2S bit clock to VSM
- AE_DATAI
- Audio Encoder Input data (PCM)
- AE_DATAI_DV
- Audio Encoder Input data (PCM) from DVO
- AE_DATAO
- Audio Encoder Output data (PCM)
- AE_WCLK_DV
- Audio Encoder I2S word clock
- AE_WCLK_DV
- Audio Encoder I2S word clock to DVO
- ANA_WE
- Audio Encoder I2S word clock to VSM
- ANA_WE
- Analogue write enable
- ANA_WE_LV

- Analogue write enable Low Voltage
- B_IN_VIP
- Basic Engine Input to Video Input Processor
- B_OUT
- Video blue output from Host Decoder
- B_OUT_B
- Filtered blue video output
- FAN
- Bank Address
- BCLK_CTL_SERVICE
- Bitclock control Service Interface
- BCLK_CTL
- Basic Engine I2S bit clock
- BE_BCLK_VSM
- Basic Engine I2S bit clock to VSM
- BE_CPN
- Basic Engine Control Processor ready to accept data
- BE_DATA_RD
- Basic Engine Data read
- BE_DATA_WR
- Basic Engine Data write
- BE_FAN
- Basic Engine FAN
- BE_FLAG
- Basic Engine error flag
- BE_LOAD
- Basic Engine interrupt request
- BE_LOADN
- Basic Engine LOAD(LOW active)
- BE_RXD
- Basic Engine line I2S received data
- BE_SDR
- Basic Engine servo unit ready to accept data (S2B)
- BE_SYNC
- Basic Engine sectorizes time sync
- BE_TXD
- Basic Engine I2S transmitted data
- BE_V4
- Basic Engine versatile input pin
- BE_VIP
- Basic Engine I2S word clock
- C_IN
- Video Chrominance Input
- C_IN_VIP
- Chrominance Input to Video Input Processor
- C_OUT
- Chrominance output from Host Decoder
- C_OUT_B
- Filtered Chrominance output
- CAS
- Column Address strobe
- CLE_OUT(0:9)
- Chrominance Blue out
- CLOCK
- SDRAM clock
- CPUNT0
- Control processor unit interrupt
- CPUNT1
- Control processor unit interrupt
- CP_OUT(0:9)
- Chrominance Red out
- CTSTP
- Chrominance strobe
- CVRBS_OUT
- Composite video output of the Host Decoder
- CVRBS_OUT_B
- Filtered Composite video output
- CVRBS_OUT_LB_VIP
- Composite video output to Video Input Processor(digital board video loop)
- CVRBS_Y_IN
- Composite video Luminance input
- CVRBS_Y_IN
- Composite video Luminance input
- CVRBS_Y_IN_B
- Composite video Luminance input to Video Input Processor

Variable Stream Manager UART11 received data to analog

VSM_UART12_BT5N

Variable Stream Manager UART2 received data to DVO

board

VSM_UART2_RX

Variable Stream Manager UART1 transmitted data to analog

board

VSM_UART2_TX

Variable Stream Manager UART2 transmitted data to DVO

board

Vertical synchronization OUT

WE

Write Enable

Luminance input from analog board

Y_OUT

Luminance output from Host Decoder

Y_OUT10

High frequency output

Y1_OUT1000

Luminance output from FLI

DVO Board

+3V_VD_EDO

+3V3 Power supply EDO Bus IC7404

+3V3

+3V3 Power supply

+3V3 Power supply for IC7500

+3V3 DV

+3V3 Power supply for IC7404

+3V3 FRSA

+3V3 FRSA CONF

+3V3 Power supply for IC7303

+3V3 IEEE_A

+3V3 IEEE_D

+3V3 Digital Power supply for PHY IC7101

+3V3 IEEE_PLL

+3V3 Power supply for PHY IC7101

+3V3 Power supply IC7101

+3V3 Power supply IC7103

+3V3 PLL

+3V3 Power supply IC7307 & IC7308

+3V3 Power supply IC7301, IC7302, IC7305 & IC7306

+3V3

+3V3 Power supply

+3V3 PRCC

+3V3 Power supply IC7200, IC7201, IC7202 & IC7208

+VCC_DV_RAM

+3V3 Power supply for DV_RAM (IC7400-> IC7404)

1394_RSTN

Reset of LINK IC (7103) and PHY IC (7101)

Address lines

AUD_BCLK

Audio Bit Clock

AUD_MUTE

Audio Mute

AUD_SDI

Audio Serial Data Input

AUD_SDO_CON

Audio SDO CON Output to buffer IC7305

AUD_SDO_DAC

Audio Serial Data Output to DAC IC7305

AUD_WS_701

Audio Word Select to DV CODEC IC7404

Buffer Enable Audio

Buffer Enable Video

CCJK

Configuration Clock

CLK27M

CLK27M_CON

27MHz Clock to Digital Board

CLK27M_DV

27MHz Clock Digital Video Code

CLK27M_CON

27MHz Clock IC7304

CLOCKGENAID

Clock generator Audio

CLOCKGENVID

Clock generator Video

CTSIN

Chatter to Send

DATA

Data

Done

Indication of the completion of the configuration process

DOOUT

Serial configuration data output

DV_CODEC

DV_CODEC Address Strobe

DV_DRON

DV_CODEC Data Request Interrupt

DV_DSUN

DV_CODEC Data Strobes Lower 8 bits

DV_DTACKN

DV_CODEC Data Strobes Upper 8 Bits

DV_ERRN

DV_CODEC Data Transfer Acknowledge

DV_ERRN

DV_CODEC Error Interrupt

DV_HS_IN

DV_CODEC Horizontal synchronization In

DV_HS_OUT

DV_CODEC Horizontal synchronization Out

DV_LCN

DV_CODEC Last Code Interrupt

DV_RSTN

DV_CODEC Power Down

DV_RSTN

DV_CODEC System Reset for NW701

DV_RSTN

DV_CODEC Read/Write control signal

DV_VS

DV_CODEC Vertical synchronization

FIFO_A(015)

FIFO buffer A Address bus

FIFO_A(015)

FIFO buffer A Output enable

FIFO_A(015)

FIFO buffer A Write enable

FIFO_A(015)

Host Address/Data bus for register settings of IC7404

INITN

Initiate Configuration

IC(030)

IC(030) bus of IC7404

ISP

LINK_AVALID

LINK IC Audio/Video data valid

LINK_AVALID

LINK IC chip select

LINK_INTN

LINK IC interrupt

LINK_PDO_QC(07)

LINK IC audio data interface

PA(015)

SHAM processor address

PAD(07)

SHAM processor data

PAL

Processor Address Latch Enable

PHY_CNA

PHY 1594 cable not active

PHY_CNA

PHY 1594 cable not active

LINK_IC power status

PINTON

Processor interrupt 0

PINTIN

Processor interrupt 1

PRDN

Address Latch Enable

AM0

Access-mode 0

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1

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Access-mode 1

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Access-mode 1

Access-mode 1

Access-mode 1

Access-mode 1


Access-mode 1

10. Spare Parts List

Mechanical Parts		Display Board		Front AV Board		Analog Board	
Various		Various		Various		Various	
00001	CONTROL PANEL ASSY EU	1111	4822 242 82114	1160	4822 276 13732	7100	2722 171 07729
00001	DVO, DVDR80	1160	4822 276 13732	7101	4822 276 13732	7101	3198 010 42310
00001	CONTROL PANEL ASSY	1160	4822 276 13732	7102	4822 276 13732	7102	3198 010 42310
00001	EU, DVDR80	1160	4822 276 13732	7103	4822 276 13732	7103	3198 010 42310
00001	CONTROL PANEL ASSY UK	1160	4822 276 13732	7104	4822 276 13732	7104	3198 010 42310
00001	UK, DVDR80/05x	1160	4822 276 13732	7105	4822 276 13732	7105	3198 010 42310
00001	DVO, DVDR80/05x	1160	4822 276 13732	7106	4822 276 13732	7106	3198 010 42310
00010	KEY-SET RIGHT ASSY	1160	4822 276 13732	7107	4822 276 13732	7107	3198 010 42310
00010	KEY-SET LEFT ASSY	1160	4822 276 13732	7108	4822 276 13732	7108	3198 010 42310
00010	KEY-SET LEFT ASSY	1160	4822 276 13732	7109	4822 276 13732	7109	3198 010 42310
00021	DISPLAY-DECOR-WINDOW	1160	4822 276 13732	7110	4822 276 13732	7110	3198 010 42310
00021	FLAP ASSY, DVDR80	1160	4822 276 13732	7111	4822 276 13732	7111	3198 010 42310
00026	FLAP ASSY, DVDR80	1160	4822 276 13732	7112	4822 276 13732	7112	3198 010 42310
00026	FLAP ASSY, DVDR80	1160	4822 276 13732	7113	4822 276 13732	7113	3198 010 42310
00070	TOY FRONT ASSY	1160	4822 276 13732	7114	4822 276 13732	7114	3198 010 42310
00070	TOY FRONT ASSY	1160	4822 276 13732	7115	4822 276 13732	7115	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7116	4822 276 13732	7116	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7117	4822 276 13732	7117	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7118	4822 276 13732	7118	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7119	4822 276 13732	7119	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7120	4822 276 13732	7120	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7121	4822 276 13732	7121	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7122	4822 276 13732	7122	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7123	4822 276 13732	7123	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7124	4822 276 13732	7124	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7125	4822 276 13732	7125	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7126	4822 276 13732	7126	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7127	4822 276 13732	7127	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7128	4822 276 13732	7128	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7129	4822 276 13732	7129	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7130	4822 276 13732	7130	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7131	4822 276 13732	7131	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7132	4822 276 13732	7132	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7133	4822 276 13732	7133	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7134	4822 276 13732	7134	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7135	4822 276 13732	7135	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7136	4822 276 13732	7136	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7137	4822 276 13732	7137	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7138	4822 276 13732	7138	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7139	4822 276 13732	7139	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7140	4822 276 13732	7140	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7141	4822 276 13732	7141	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7142	4822 276 13732	7142	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7143	4822 276 13732	7143	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7144	4822 276 13732	7144	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7145	4822 276 13732	7145	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7146	4822 276 13732	7146	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7147	4822 276 13732	7147	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7148	4822 276 13732	7148	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7149	4822 276 13732	7149	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7150	4822 276 13732	7150	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7151	4822 276 13732	7151	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7152	4822 276 13732	7152	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7153	4822 276 13732	7153	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7154	4822 276 13732	7154	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7155	4822 276 13732	7155	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7156	4822 276 13732	7156	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7157	4822 276 13732	7157	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7158	4822 276 13732	7158	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7159	4822 276 13732	7159	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7160	4822 276 13732	7160	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7161	4822 276 13732	7161	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7162	4822 276 13732	7162	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7163	4822 276 13732	7163	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7164	4822 276 13732	7164	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7165	4822 276 13732	7165	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7166	4822 276 13732	7166	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7167	4822 276 13732	7167	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7168	4822 276 13732	7168	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7169	4822 276 13732	7169	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7170	4822 276 13732	7170	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7171	4822 276 13732	7171	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7172	4822 276 13732	7172	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7173	4822 276 13732	7173	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7174	4822 276 13732	7174	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7175	4822 276 13732	7175	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7176	4822 276 13732	7176	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7177	4822 276 13732	7177	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7178	4822 276 13732	7178	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7179	4822 276 13732	7179	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7180	4822 276 13732	7180	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7181	4822 276 13732	7181	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7182	4822 276 13732	7182	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7183	4822 276 13732	7183	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7184	4822 276 13732	7184	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7185	4822 276 13732	7185	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7186	4822 276 13732	7186	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7187	4822 276 13732	7187	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7188	4822 276 13732	7188	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7189	4822 276 13732	7189	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7190	4822 276 13732	7190	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7191	4822 276 13732	7191	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7192	4822 276 13732	7192	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7193	4822 276 13732	7193	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7194	4822 276 13732	7194	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7195	4822 276 13732	7195	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7196	4822 276 13732	7196	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7197	4822 276 13732	7197	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7198	4822 276 13732	7198	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7199	4822 276 13732	7199	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7200	4822 276 13732	7200	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7201	4822 276 13732	7201	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7202	4822 276 13732	7202	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7203	4822 276 13732	7203	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7204	4822 276 13732	7204	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7205	4822 276 13732	7205	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7206	4822 276 13732	7206	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7207	4822 276 13732	7207	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7208	4822 276 13732	7208	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7209	4822 276 13732	7209	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7210	4822 276 13732	7210	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7211	4822 276 13732	7211	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7212	4822 276 13732	7212	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7213	4822 276 13732	7213	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732	7214	4822 276 13732	7214	3198 010 42310
00030	COVER ASSY	1160	4822 276 13732</				

Mechanical Parts	
00001	3103 607 90002 CONTROL PANEL ASSY EU DVO, DVDR80
00001	3103 607 90071 CONTROL PANEL ASSY EU, DVDR80
00001	3103 607 90101 CONTROL PANEL ASSY UK, DVDR80/05x
00001	3103 607 90112 DVO, DVDR80/05x
00010	3103 607 50101 KEY-SET RIGHT ASSY
00011	3103 607 50131 KEY-SET LEFT ASSY
00021	3103 607 50181 DISPLAY-DECOR-WINDOW FRONT
00026	3103 607 50191 FLAT ASSY - DVDR80
00026	3103 607 50271 FLAT ASSY DVO, DVDR80
01070	3103 607 90081 TRAY FRONT ASSY
01055	3103 607 50021 FOOT ASSY
03030	3103 607 50231 COVER ASSY
Miscellaneous Parts	
03050	3128 127 14021 REMOTE CONTROL 25110/01
0351A	2422 070 98133 MANSCORD EURO
0352A	3103 601 00111 SCART CABLE EU
0352	3103 601 00111 SCART CABLE EU 2X2RCA
0355	3103 309 92610 MALE 1.5MTR
0356	4822 321 61579 VIDEO-CABLE
0357	4822 320 50377 CONNECT. CABLE PAL
0365	9307 002 60006 DVDRW/06 PHILIPS DISC
0380	3103 605 20011 DIR. FOR USE DVDR 880/01
0380	3103 605 20031 DIR. FOR USE DVDR 880/02
0380	3103 605 20051 DIR. FOR USE DVDR 880/03
0380	3103 605 20061 DIR. FOR USE DVDR 880/04
0380	3103 605 20101 DIR. FOR USE DVDR 880/05
0381	3103 605 20201 DIR. FOR USE DVDR 880/06
0381	3103 605 20241 DIR. FOR USE DVDR 880/07
0381	3103 605 20071 DIR. FOR USE DVDR 880/08
0381	3103 605 20091 DIR. FOR USE DVDR 880/09
1001A	3103 608 50180 ANALOGUE/POWER BOARD EURO
1001A	3103 608 50240 ANALOGUE/POWER BOARD UK
1003A	3104 128 08440 PCB ASSY DIG BOARD 1.5 EU
1003A	3104 128 08500 PCB ASSY DVO 4323
1004A	3103 608 50170 DISPLAY BOARD
1005	3103 608 50320 BOARD CONNECTOR
1006	3104 128 07610 PCB ASSY 4319 DVO-FRONT
1007	3103 601 00072 FC FC 10L/06471/0P BD
8001	3103 601 00012 FFC FOL 22P/90/22P BD
8003	3103 601 00032 CBL KR 40L/100T/010P AD
8004	3103 601 00042 CBL KR 40P/105/4P KR SHL
8005	3103 601 00052 FFC FOL 22P/200/22P BD
8006	3103 601 00062 CBL KR 12P/115/12P KR UL
8007	3103 601 00072 FC FC 10L/06471/0P BD
8008	3104 157 11790 CIVAS SPLIT FLEX 30 100 325
8009	3103 601 00082 CBL KR 9P/110/8P KR UL
8010	3103 601 00132 SHIELDED CABLE IEEE 1394 4P AMP
8011	3104 128 93231 CABLE IEEE 1394 4P AMP

Display Board	
Various	
1111	4822 242 82114 EFOE08004714
1160	4822 276 173732 SWITCH TACT PUS
1161	4822 276 173732 SWITCH TACT PUS
1162	4822 276 173732 SWITCH TACT PUS
1163	4822 276 173732 SWITCH TACT PUS
1164	4822 276 173732 SWITCH TACT PUS
1165	4822 276 173732 SWITCH TACT PUS
1166	4822 276 173732 SWITCH TACT PUS
1170	4822 276 173732 SWITCH TACT PUS
1171	4822 276 173732 SWITCH TACT PUS
1180	4822 276 173732 SWITCH TACT PUS
1916	4822 267 11031 10P_FEM_V
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1100	3168 017 34739 0603 16V 47HF COL
2100	4822 124 11562 470F 5% 63V
2102	4822 124 11562 470F 5% 63V
2103	4822 124 11562 470F 5% 63V
2104	4822 124 11562 470F 5% 63V
2104	3168 017 34730 0603 16V 47HF COL
2105	5322 126 11578 10F 10% 50V 0603
2106	4822 126 13879 220F 20% 16V
2111	3168 017 34730 0603 16V 47HF COL
2112	4822 124 11946 220F 20% 16V
2113	4822 124 11946 220F 20% 16V
2114	4822 124 11946 220F 20% 16V
2115	4822 124 11946 220F 20% 16V
2168	5322 126 11563 10F 10% 50V 0603
2169	5322 126 11563 10F 10% 50V 0603
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3101	4822 051 30103 10K 5% 0.062W
3101	4822 116 52304 82K 5% 0.5W
3102	4822 116 52304 82K 5% 0.5W
3103	4822 051 30471 470K 5% 0.062W
3104	4822 051 30471 470K 5% 0.062W
3104	4822 051 30471 470K 5% 0.062W
3105	4822 051 30381 330K 1% 0.062W
3105	4822 051 30381 330K 1% 0.062W
3106	4822 051 30102 1K 1% 0.062W
3106	4822 051 30102 1K 1% 0.062W
3109	4822 116 52383 487 5% 0.5W
3110	4822 050 11002 1K 1% 0.4W
3111	4822 051 30471 470K 5% 0.062W
3111	4822 116 53964 47K 5% 0.5W
3120	4822 050 21003 10K 1% 0.6W
3121	4822 051 30101 100K 5% 0.062W
3121	4822 116 52175 100K 5% 0.5W
3122	4822 116 52175 100K 5% 0.5W
3127	4822 050 11002 1K 1% 0.4W
3128	4822 116 52357 22K 5% 0.5W
3150	4822 116 53872 220K 5% 0.5W
3151	4822 051 30102 1K 5% 0.062W
3151	4822 051 30102 1K 5% 0.062W
3160	4822 051 30103 10K 5% 0.062W
3161	4822 051 30321 220K 5% 0.062W
3162	4822 051 30321 220K 5% 0.062W
3162	4822 051 30321 220K 5% 0.062W
3169	4822 051 30322 242 5% 0.062W
3169	4822 051 30322 242 5% 0.062W
3170	4822 051 30102 1K 5% 0.062W
3171	4822 051 30102 1K 5% 0.062W
3172	4822 117 12063 NTC DC BR 10K 5%
3180	4822 117 12925 47K 1% 0.063W 0603
3181	4822 051 30321 220K 5% 0.062W
3182	4822 051 30321 220K 5% 0.062W
3194	4822 117 12917 11K 5% 0.062W CASE0603
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5110	4822 157 11708 10uH 5% 2.4X2.4
5191	2422 549 44607 IND_FXD SM EM100mH 2
5192	2422 549 44607 IND_FXD SM EM100mH 2
5193	4822 157 50964 10uH
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6100	4822 130 10652 SZX284-2C/8
6180	4822 130 83092 TLH4205

	7100	2722	171	07729	VFD 10-BT-242GNK (FT80)B
	7101	3198	010	42310	BC847B
	7102	3198	010	42310	BC847B
	7103	4822	130	40981	BC937-25
	7104	4822	130	41246	BC937-25
	7105	3198	010	42310	BC847B
	7106	3198	010	42310	BC847B
	7107	3198	010	42310	BC847B
	7110	3922	155	82687	TM987DS474/LDCP1
	7115	3922	155	82687	IR RECEIVER TSP2236
	7180	4822	130	60954	DTA124E-UW
Front AV Board					
Various					
	1910	2422	026	05301	SOC CINCH V 3P FJ-PJ1127
	1911	2422	025	10165	CON BM H 9P M 2.00 PHB
	1912	2422	026	05307	CON MDIN H 4P F-KF51 B
+					
	2202	4822	136	14241	0693 50V 330P COL R
	2203	4822	136	14241	0693 50V 330P COL R
	2206	2236	596	59812	0693 50V 100N90M
+					
	3201	4822	051	30102	1k 5%, 0.062W
	3202	4822	051	30105	1M 5%, 0.062W
	3205	4822	051	30102	1k 5%, 0.062W
	3207	4822	051	30105	1M 5%, 0.062W
	3210	4822	116	83868	150Q 5%, 0.5W
	3211	4822	051	30759	750 5%, 0.062W
	3212	4822	051	30769	750 5%, 0.062W
	3213	4822	051	30759	750 5%, 0.062W
+					
	6200	9322	146	61685	DIO REG SM D3F3A6.8FU
	6201	9322	146	61685	TSJ3
	6202	9322	146	61685	DIO REG SM D3F3A6.8FU
	6203	9322	146	61685	TSJ3
	6204	9322	146	61685	DIO REG SM D3F3A6.8FU
Analog Board					
Various					
	1001A	2422	086	10919	PROT DEV 65V 125MA MP13
	1302A	4822	252	11215	1937A0IN-A21F
	1303A	4822	071	51002	193721(A)P
	1304A	2422	086	10786	DEV RADIAL-AMP.
	1305A	4822	086	10919	PROT DEV 65V 125MA
	1307A	2422	086	10954	PROT DEV 65V 1A PSC
	1308A	2422	086	10951	PROT DEV 65V 500MA PSC
	1309A	4822	071	59031	FUSE 800MA PSC
	1600	4822	242	10434	11001-915263-1 0E(18.432KHz)
	1701	4822	242	81436	DFWKG3953M
	1702	2422	549	44341	PLT SAW 38MHz 9
	1703	4822	242	10307	CFWKG656M
	1704	4822	242	81436	CFWKG3953M
	1705	2422	549	44611	PLT CER 5MHz 5
	1706	3139	147	17001	TPSR7M802 BS A
	1707	4822	242	81572	TPS36-OMB-TF21
	1900	4822	265	11154	920303-2210 (22P)
	1931A	2422	030	00304	SOC SUPP AC HOR MALL
	1932	2422	025	10772	SOC SUPP 1V 12P M 2.00 PH B
	1933	4822	265	11552	CONN 8P

Spare Parts List

EN 213

EN 214 10.

Spare Parts List

1940	2422 033 00334	GN1DL	CON BM EURO H 42P F BK	2408	3198 017 41050	0603 10V 1µF COL R	2609	4822 124 21722	104F 20% 25V
				2409	2328 586 59812	0603 50V 100NPR0M	2610	4822 124 24225	504F 5% 50V 0603
1942	2422 025 10769	CON BMT 9P VERT PH-B	2410	3198 017 41050	0603 10V 1µF COL R	2611	5322 126 11583	104F 10% 50V 0603	
				2411	2328 586 59812	0603 50V 100NPR0M	2612	4822 124 80331	474F 20% 16V
1945	3103 605 50330	UF SUB PCB2 EURO	2412	4822 122 33741	47µF 10% 50V	2613	4822 124 40769	4.7µF 10% 100V	
				2413	4822 122 33741	47µF 10% 50V	2616	5322 126 11578	114F 10% 50V 0603
1948	4822 025 10934	4P, 40M, 1N	2414	2328 586 59812	0603 50V 100NPR0M	2617	5322 126 11578	114F 10% 50V 0603	
				2415	3198 017 41050	0603 10V 1µF COL R	2620	3198 016 33380	0603 50V 393 COL R
1950	4822 025 06349	YEWUOH 3P F	2416	3198 017 41050	0603 10V 1µF COL R	2621	2328 586 59812	0603 50V 393 COL R	
				2417	3198 017 41050	0603 10V 1µF COL R	2623	2328 586 59812	0603 50V 393 COL R
1951	4822 267 31729	CON BM CINC1H F BK B	2418	3198 017 41050	0603 10V 1µF COL R	2626	4822 124 22652	2.2µF 20% 50V	
				2419	3198 017 41050	0603 10V 1µF COL R	2627	4822 124 22652	2.2µF 20% 50V
1990	2422 025 0406	CON BM 4P VERT PH-B	2420	2328 586 59812	0603 50V 100NPR0M	2631	4822 124 11946	2.2µF 20% 16V	
				2421	4822 124 11947	104F 20% 16V	2632	4822 124 11946	2.2µF 20% 16V
-H-				2422	5322 126 11583	104F 10% 50V 0603	2633	4822 124 22652	2.2µF 20% 50V
				2423	3198 017 41050	0603 10V 1µF COL R	2634	4822 124 22652	2.2µF 20% 50V
2001	4822 124 80483	474F 20% 6.3V	2424	4822 124 80483	47µF 20% 6.3V	2635	5322 126 33961	120µF 10% 50V	
2002	2328 586 59812	0603 50V 100NPR0M	2425	2328 586 59812	0603 50V 100NPR0M	2636	5322 124 31739	2.2µF 20% 50V	
2003	2328 586 59812	0603 50V 100NPR0M	2426	5322 126 11583	104F 10% 50V 0603	2637	4822 124 80483	474F 20% 6.3V	
2004	4822 124 80483	474F 20% 6.3V	2427	4822 124 11946	2.2µF 20% 16V	2638	5322 126 11583	104F 10% 50V 0603	
2005	4822 124 22785	0603 50V 47P PMS	2428	4822 124 22785	0603 50V 47P PMS	2639	5322 126 11583	104F 10% 50V 0603	
2006	4822 126 11578	104F 20% 25V	2429	4822 126 11578	104F 20% 25V	2640	5322 126 11578	104F 10% 50V 0603	
2007	4822 126 11578	104F 20% 25V	2430	4822 126 11578	104F 20% 25V	2641	5322 126 11578	104F 10% 50V 0603	
2008	4822 126 11578	104F 20% 25V	2431	4822 126 11578	104F 20% 25V	2642	5322 126 11578	104F 10% 50V 0603	
2009	2328 586 59812	0603 50V 100NPR0M	2432	2328 586 59812	0603 50V 100NPR0M	2643	5322 126 11578	104F 10% 50V 0603	
2010	4822 124 21732	104F 20% 6.3V	2433	4822 124 21732	104F 20% 6.3V	2644	5322 126 11578	104F 10% 50V 0603	
2011	4822 124 21732	104F 20% 6.3V	2434	4822 124 21732	104F 20% 6.3V	2645	5322 126 11578	104F 10% 50V 0603	
2012	2328 586 59812	0603 50V 100NPR0M	2435	2328 586 59812	0603 50V 100NPR0M	2646	5322 126 11578	104F 10% 50V 0603	
2013	4822 124 22652	104F 20% 6.3V	2436	4822 124 22652	104F 20% 6.3V	2647	5322 126 11578	104F 10% 50V 0603	
2014	2328 586 59812	0603 50V 100NPR0M	2437	2328 586 59812	0603 50V 100NPR0M	2648	5322 126 11578	104F 10% 50V 0603	
2015	2328 586 59812	0603 50V 100NPR0M	2438	2328 586 59812	0603 50V 100NPR0M	2649	5322 126 11578	104F 10% 50V 0603	
2016	2328 586 59812	0603 50V 100NPR0M	2439	2328 586 59812	0603 50V 100NPR0M	2650	5322 126 11578	104F 10% 50V 0603	
2017	2328 586 59812	0603 50V 100NPR0M	2440	2328 586 59812	0603 50V 100NPR0M	2651	5322 126 11578	104F 10% 50V 0603	
2018	2328 586 59812	0603 50V 100NPR0M	2441	2328 586 59812	0603 50V 100NPR0M	2652	5322 126 11578	104F 10% 50V 0603	
2019	2328 586 59812	0603 50V 100NPR0M	2442	4822 124 11946	2.2µF 20% 16V	2653	5322 126 11578	104F 10% 50V 0603	
2020	4822 124 80483	474F 20% 6.3V	2443	4822 124 80483	474F 20% 6.3V	2654	5322 126 11583	104F 10% 50V 0603	
2023	4822 124 80483	474F 20% 6.3V	2444	4822 124 80483	474F 20% 6.3V	2655	5322 126 11583	104F 10% 50V 0603	
2024	4822 124 80483	474F 20% 6.3V	2445	4822 124 80483	474F 20% 6.3V	2656	5322 126 11583	104F 10% 50V 0603	
2025	3198 016 31325	6063 50V 0603	2446	4822 126 14225	56µF 5% 50V 0603	2657	4822 126 14225	56µF 5% 50V 0603	
2026	4822 126 14225	56µF 5% 50V 0603	2447	4822 126 14225	56µF 5% 50V 0603	2658	4822 126 14225	56µF 5% 50V 0603	
2027	4822 126 14225	56µF 5% 50V 0603	2448	4822 126 14225	56µF 5% 50V 0603	2659	4822 126 14225	56µF 5% 50V 0603	
2028	4822 126 14225	56µF 5% 50V 0603	2449	4822 126 14225	56µF 5% 50V 0603	2660	4822 126 14225	56µF 5% 50V 0603	
2029	4822 126 14225	56µF 5% 50V 0603	2450	4822 126 14225	56µF 5% 50V 0603	2661	4822 126 14225	56µF 5% 50V 0603	
2030	4822 126 14225	56µF 5% 50V 0603	2451	4822 126 14225	56µF 5% 50V 0603	2662	4822 126 14225	56µF 5% 50V 0603	
2031	4822 126 14225	56µF 5% 50V 0603	2452	4822 126 14225	56µF 5% 50V 0603	2663	4822 126 14225	56µF 5% 50V 0603	
2032	4822 126 14225	56µF 5% 50V 0603	2453	4822 126 14225	56µF 5% 50V 0603	2664	4822 126 14225	56µF 5% 50V 0603	
2033	4822 126 14225	56µF 5% 50V 0603	2454	4822 126 14225	56µF 5% 50V 0603	2665	4822 126 14225	56µF 5% 50V 0603	
2034	4822 126 14225	56µF 5% 50V 0603	2455	4822 126 14225	56µF 5% 50V 0603	2666	4822 126 14225	56µF 5% 50V 0603	
2035	4822 126 14225	56µF 5% 50V 0603	2456	4822 126 14225	56µF 5% 50V 0603	2667	4822 126 14225	56µF 5% 50V 0603	
2036	4822 126 14225	56µF 5% 50V 0603	2457	4822 126 14225	56µF 5% 50V 0603	2668	4822 126 14225	56µF 5% 50V 0603	
2037	4822 126 14225	56µF 5% 50V 0603	2458	4822 126 14225	56µF 5% 50V 0603	2669	4822 126 14225	56µF 5% 50V 0603	
2038	4822 126 14225	56µF 5% 50V 0603	2459	4822 126 14225	56µF 5% 50V 0603	2670	4822 126 14225	56µF 5% 50V 0603	
2039	4822 126 14225	56µF 5% 50V 0603	2460	4822 126 14225	56µF 5% 50V 0603	2671	4822 126 14225	56µF 5% 50V 0603	
2040	4822 126 14225	56µF 5% 50V 0603	2461	4822 126 14225	56µF 5% 50V 0603	2672	4822 126 14225	56µF 5% 50V 0603	
2041	4822 126 14225	56µF 5% 50V 0603	2462	4822 126 14225	56µF 5% 50V 0603	2673	4822 126 14225	56µF 5% 50V 0603	
2042	4822 126 14225	56µF 5% 50V 0603	2463	4822 126 14225	56µF 5% 50V 0603	2674	4822 126 14225	56µF 5% 50V 0603	
2043	4822 126 14225	56µF 5% 50V 0603	2464	4822 126 14225	56µF 5% 50V 0603	2675	4822 126 14225	56µF 5% 50V 0603	
2044	4822 126 14225	56µF 5% 50V 0603	2465	4822 126 14225	56µF 5% 50V 0603	2676	4822 126 14225	56µF 5% 50V 0603	
2045	4822 126 14225	56µF 5% 50V 0603	2466	4822 126 14225	56µF 5% 50V 0603	2677	4822 126 14225	56µF 5% 50V 0603	
2046	4822 126 14225	56µF 5% 50V 0603	2467	4822 126 14225	56µF 5% 50V 0603	2678	4822 126 14225	56µF 5% 50V 0603	
2047	4822 126 14225	56µF 5% 50V 0603	2468	4822 126 14225	56µF 5% 50V 0603	2679	4822 126 14225	56µF 5% 50V 0603	
2048	4822 126 14225	56µF 5% 50V 0603	2469	4822 126 14225	56µF 5% 50V 0603	2680	4822 126 14225	56µF 5% 50V 0603	
2049	4822 126 14225	56µF 5% 50V 0603	2470	4822 126 14225	56µF 5% 50V 0603	2681	4822 126 14225	56µF 5% 50V 0603	
2050	4822 126 14225	56µF 5% 50V 0603	2471	4822 126 14225	56µF 5% 50V 0603	2682	4822 126 14225	56µF 5% 50V 0603	
2051	4822 126 14225	56µF 5% 50V 0603	2472	4822 126 14225	56µF 5% 50V 0603	2683	4822 126 14225	56µF 5% 50V 0603	
2052	4822 126 14225	56µF 5% 50V 0603	2473	4822 126 14225	56µF 5% 50V 0603	2684	4822 126 14225	56µF 5% 50V 0603	
2053	4822 126 14225	56µF 5% 50V 0603	2474	4822 126 14225	56µF 5% 50V 0603	2685	4822 126 14225	56µF 5% 50V 0603	
2054	4822 126 14225	56µF 5% 50V 0603	2475	4822 126 14225	56µF 5% 50V 0603	2686	4822 126 14225	56µF 5% 50V 0603	
2055	4822 126 14225	56µF 5% 50V 0603	2476	4822 126 14225	56µF 5% 50V 0603	2687	4822 126 14225	56µF 5% 50V 0603	
2056	4822 126 14225	56µF 5% 50V 0603	2477	4822 126 14225	56µF 5% 50V 0603	2688	4822 126 14225	56µF 5% 50V 0603	
2057	4822 126 14225	56µF 5% 50V 0603	2478	4822 126 14225	56µF 5% 50V 0603	2689	4822 126 14225	56µF 5% 50V 0603	
2058	4822 126 14225	56µF 5% 50V 0603	2479	4822 126 14225	56µF 5% 50V 0603	2690	4822 126 14225	56µF 5% 50V 0603	
2059	4822 126 14225	56µF 5% 50V 0603	2480	4822 126 14225	56µF 5% 50V 0603	2691	4822 126 14225	56µF 5% 50V 0603	
2060	4822 126 14225	56µF 5% 50V 0603	2481	4822 126 14225	56µF 5% 50V 0603	2692	4822 126 14225	56µF 5% 50V 0603	
2061	4822 126 14225	56µF 5% 50V 0603	2482	4822 126 14225	56µF 5% 50V 0603	2693	4822 126 14225	56µF 5% 50V 0603	
2062	4822 126 14225	56µF 5% 50V 0603	2483	4822 126 14225	56µF 5% 50V 0603	2694	4822 126 14225	56µF 5% 50V 0603	
2063	4822 126 14225	56µF 5% 50V 0603	2484	4822 126 14225	56µF 5% 50V 0603	2695	4822 126 14225	56µF 5% 50V 0603	
2064	4822 126 14225	56µF 5% 50V 0603	2485	4822 126 14225	56µF 5% 50V 0603	2696	4822 126 14225	56µF 5% 50V 0603	
2065	4822 126 14225	56µF 5% 50V 0603	2486	4822 126 14225	56µF 5% 50V 0603	2697	4822 126 14225	56µF 5% 50V 0603	
2066	4822 126 14225	56µF 5% 50V 0603	2487	4822 126 14225	56µF 5% 50V 0603	2698	4822 126 14225	56µF 5% 50V 0603	
2067	4822 126 14225	56µF 5% 50V 0603	2488	4822 126 14225	56µF 5% 50V 0603	2699	4822 126 14225	56µF 5% 50V 0603	
2068	4822 126 14225	56µF 5% 50V 0603	2489	4822 126 14225	56µF 5% 50V 0603	2700	4822 126 14225	56µF 5% 50V 0603	
2069	4822 126 14225	56µF 5% 50V 0603	2490	4822 126 14225	56µF 5% 50V 0603	2701	4822 126 14225	56µF 5% 50V 0603	
2070	4822 126 14225	56µF 5% 50V 0603	2491	4822 126 14225	56µF 5% 50V 0603	2702	4822 126 14225	56µF 5% 50V 0603	
2071	4822 126 14225	56µF 5% 50V 0603	2492	4822 126 14225	56µF 5% 50V 0603	2703	4822 126 14225	56µF 5% 50V 0603	
2072	4								

[illegible]TFM SMT SLOT
SRW28EC9-E01V0• B

7905	5322 209 17568	PC74HC1T4T
4822 242 10838	27MHz 120P FX0-31FT	
7906		
5100	4822 157 11717	BLM31P600SPT
5101	4822 157 11717	BLM31P600SPT
5102	4822 157 11499	BLM11P600SPT
5103	4822 157 11499	BLM11P600SPT
5200	4822 157 11499	BLM11P600SPT
5201	4822 157 11499	BLM11P600SPT
5202	4822 157 11499	BLM11P600SPT
5203	4822 157 11499	BLM11P600SPT
5204	4822 157 11499	BLM11P600SPT
5305	4822 157 11499	BLM11P600SPT
5207	4822 157 11499	BLM11P600SPT
5208	4822 157 11499	BLM11P600SPT
5209	4822 157 11499	BLM11P600SPT
5300	4822 157 11499	BLM11P600SPT
5302	4822 157 11499	BLM11P600SPT
5400	4822 157 11499	BLM11P600SPT
5402	4822 157 11499	BLM11P600SPT
5403	4822 157 11499	BLM11P600SPT
5404	4822 157 11499	BLM11P600SPT
5500	4822 157 11499	BLM11P600SPT
5501	4822 157 11499	BLM11P600SPT
5502	4822 157 11499	BLM11P600SPT
5503	4822 157 11499	BLM11P600SPT
5504	4822 157 11499	BLM11P600SPT
5505	4822 157 11499	BLM11P600SPT
5506	4822 157 11499	BLM11P600SPT
5507	4822 157 11499	BLM11P600SPT

7. Circuit Diagrams and PWB Layouts

Display Panel

